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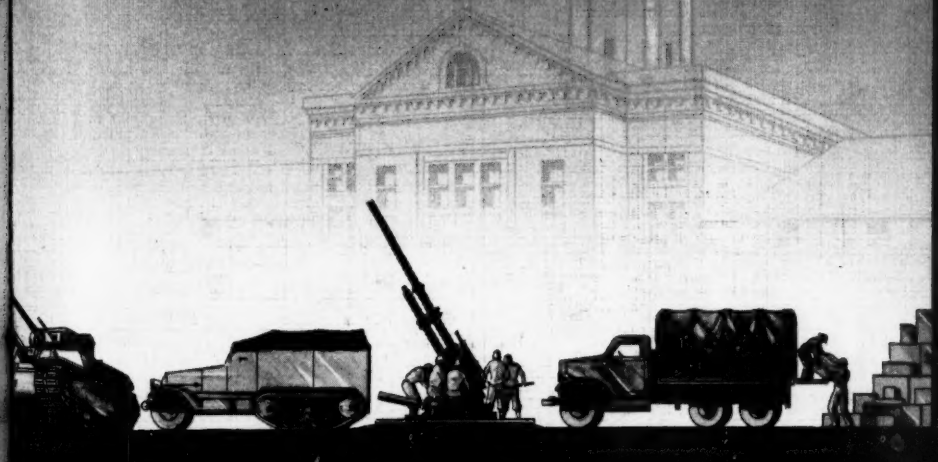

COMMAND AND GENERAL STAFF SCHOOL

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MILITARY REVIEW

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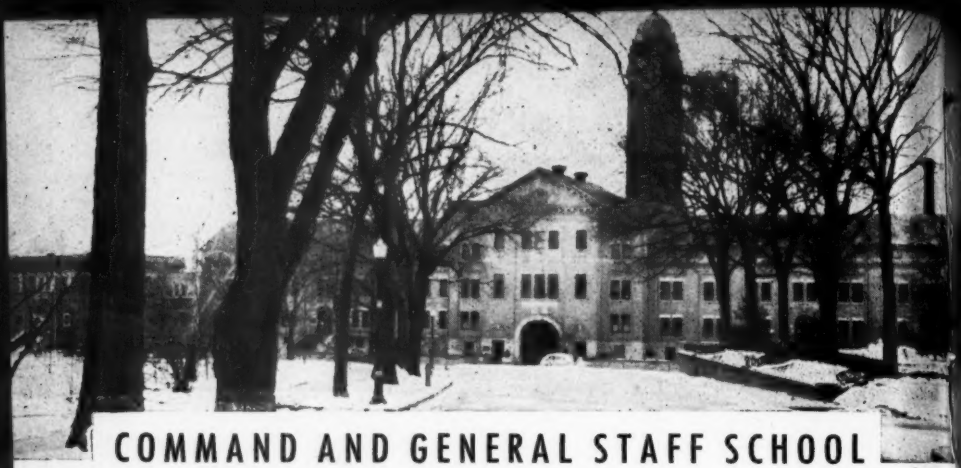

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Leadership

MAJOR GENERAL CHARLES H. CORLETT
Commanding General, XXXVI Corps

Major General Charles H. Corlett commanded Amphibious Training Force No. 9 of 35,000 troops, partly Canadian, in the occupation of Kiska. Later he commanded the 7th Division in the Kwajalein operation in the Southwest Pacific, arriving in England in time to take command of the XIX Corps in the invasion of Normandy and the advance through France.—THE EDITOR.

GENERAL PRINCIPLES

GOOD military leadership is practically the same as good leadership in any field of endeavor.

The leader, whether he be a corporal, foreman, captain, or general, must work for his subordinates with sincerity and self-forgetfulness, coupled with fairness and unmistakable firmness.

This type of leadership inspires in the American a group loyalty that is the finest product of any service that can be rendered. It is unbeatable in battle and a source of strength in peace.

The weak leader may fool his superiors but he won't fool those under him very long. The strong leader will find a quick response and an honest evaluation of his leadership. Experienced soldiers can spot a stuffed shirt as far as they can see him, whether he be a sergeant or a colonel.

While there is some showmanship in leading, the fine example of leadership based on confidence, through correct knowledge, makes the greatest and the lasting impression. The swaggering, loud showmanship usually is based on an inferiority complex. Man can be driven, through fear of punishment, to obtain results, but in the long run, leadership based on this principle is not reliable. The organization lacks heart and soul and will not rise to meet the sudden emergency.

In some cases, punishment is necessary but it must be wisely applied. In other cases, commendation is also necessary, with the same caution as to application. The two go together.

The leader must know what he wants, think rapidly, and tell his subordinates clearly and simply what is desired. The leaders should always seek the easy, correct way to perform a task. Very frequently that is not done. The bright subordinate quickly detects the inefficiency of his superior when he does things the hard way.

Above all, character is the first requisite of leadership. Men will follow a leader they know to be basically honest, intelligent, and loyal both to his superiors and to those under him.

Loyalty is an intangible that operates both up and down, and while a leader must not condone laxness or wrongdoing in his subordinates, they must know that he returns their loyalty and will not let them down under any circumstance.

THE INDIVIDUAL SOLDIER

The individual American soldier, properly trained and led, is the finest soldier in the world. He is keen and smart. He recognizes ability. It is necessary to place responsibility directly on this type of man and inspire in him a pride for his profession and unit.

For the same reason, it is most desirable in all stages of instruction to tell the soldier *why* a particular thing is done. It appeals to his sense of reason and fixes a particular feature of training in his mind as something that is necessary. Soldiers are willing to do any arduous, dangerous, difficult work when they can see it is necessary. Their will and spirit are behind it. If, on the other hand, they cannot see the necessity for the great exertion or danger, they go about it in a half-hearted manner.

The finest stimulant to the individual soldier is to place responsibility directly on him. As examples: for the care of his rifle because that rifle may save his life or the life of his best friend; to take the best of care of his truck because not only he but

many others are dependent upon that truck.

Further, it must be impressed on him that any job worth doing at all is worth doing well, that any necessary labor in the military establishment is honorable. As an example, I knew a regimental motor sergeant who never let his drivers put their trucks up for the night unless they were clean. That service company has been known to work all day and half the night in mud and water. Except for coffee and sandwiches, they had no supper. When sometime early in the morning they reached their assembly point where garages were available, each truck was cleaned before its driver went to bed. I have never seen an organization with such high morale. They were proud of this.

In disciplinary training the soldier is taught very properly the meaning of the military salute. One of the best ways to have a good saluting outfit is to tell the soldier it does not make so much difference whether or not he salutes me as a particular officer, but anyone observing him omit the salute immediately comes to the conclusion that he is dumb, he has not been trained. He has let his outfit down because his action reflects against the organization he is in as well as himself.

The individual soldier should be told that if he goes AWOL or if he shirks a part of his training, he may thereby endanger not only his own life but the life of his best friend by missing such instruction. At the critical time he may not have the ability and knowledge to protect the man, his best friend, who occupies a pup tent or slit trench with him.

Usually the organization which in battle has no stragglers or shirkers, is the one where responsibility has been placed directly on the men by their squad leaders for protecting other members of the group in an emergency—that they can't let the squad down at any time, either in training or in war.

The soldier must have relaxation of the proper kind. He is in an organization that honors the uniform. He will do nothing in that uniform to disgrace it—his squadmates won't let him. They are loyal to their superior officer because he has told them the "why of things." They are "square shooters" and will respond.

They are not mind readers, however, and someone must tell them. You can't write it to them on a mimeograph or via the bulletin board—it just doesn't take!

The Squad or Other Small Unit Leader

The squad leader should be impressed with the importance of his position. He must accept a considerable load of responsibility. He is the one who must tell his men most things. He should be encouraged in every way possible. If he is a "doer," he will probably make mistakes. He should never make the same mistake twice. We want "doers." Tactful, wise correction without injury to initiative is essential.

In battle, the infantry squad leader is one of the most important members in the big team. His actions collectively win battles. If the squad leader is not truly a tactical commander, we can have little in the Army in the way of a fighting offensive force.

By the same token, the squad leader must be fully informed of the situation of his front and on his flanks. He must know how to obtain additional support in the way of mortar fire, heavy machine-gun fire, and artillery fire. He should have training as an artillery observer.

Frequently our squad leaders are not given sufficient tactical training. They learn fast in battle but it is a costly way to learn. Where it is at all possible, each squad leader should have a map and be fully oriented in each situation. In general, he has to think faster than any other commander in modern battle.

At Kwajalein, the infantry, ably assisted by both Army and Navy artillery and air, killed more than thirty Japs for every American killed. The reason they did this was because the squad leader was thoroughly oriented in the situation, knew exactly what was expected of him and where his squad fitted into the big picture.

He knew how to use his weapons, including a medium tank attached to him, flame

thrower, mortars, machine guns, and demolition material. Each squad leader directed his small force to reduce the pillboxes in turn. He was backed up by his platoon commander who saw that he received the ammunition he needed and kept him informed on what was happening to his right and left.

Each echelon in turn gave the squad every help and support it could, but it was the squad, commanded by the squad leader, who won the separate battles that made up the whole success.

A Simple Guide to Leadership of Small Units

Every commander has a different approach to the training of leaders, and the following is but one of many devices which might prove helpful in developing thoughtful leadership. It is the text of a little card which I have had printed and distributed to each officer and man in my organization, and which I hope summarizes the salient points of combat leadership:

KEEP THIS IN YOUR POCKET IN THE FIELD

The Commanding General desires that each officer and enlisted man in this Corps learn and carry out the following procedure in training as in war:

I. Estimate of the Situation

As a soldier and a leader, I am particularly anxious that my tactical decisions will be sound because a wrong decision might be responsible not only for the lives of my comrades but failure to accomplish the task assigned. To help me THINK *rapidly, clearly,* and *logically* under stress and arrive at sound conclusions, each situation presented to me will be thought out about as follows:

1. What is my job *here* and *now* as part of the military team?
2. What and where is the enemy or obstacle to overcome?
3. Is there any friendly force near enough to help and what men and tools have I to do the job with?
4. In what different ways can I get the job *done* quickly and thoroughly with the least loss of men and equipment?
5. What is the best way?

II. Combat Orders

After I have determined the best way to do the job, I will issue my order or tell my men what to do in about the following way:

1. Tell my men briefly all they need to know about the enemy and friendly forces in the vicinity.
2. Tell what our job is to be.
3. Tell each man or leader what his job will be in the team.
4. Direct the issue of ammunition or other tools necessary.
5. Tell everyone where I, the leader, can be found during the fight.

III. Execution of Order

After issuing the order I must push the fight to the finish and *win.* I must also think of my superior commander and keep him informed by runner, or otherwise, of the situation as it progresses.

The foregoing "check list" or "guide" has been tried in several units and has proven a valuable aid.

The Platoon Commander

The platoon commander has a most difficult position to perform properly because it requires after-hour study, common sense, and an aggressive devotion to duty. He must be a generator of enthusiasm for the task at hand. He must be keen and alert to see that his squads get the support they need at the right time and place. The platoon commander should be a master at minor tactics.

It has frequently been observed that young lieutenants hesitate to do things for fear they will make a mistake, and they have a tendency to hold back and do only what they are told. This will not do.

The platoon leader must be a "doer," he must have a "can do" platoon. If he makes a mistake, his superiors should correct him but commend him for attempting in good faith the necessary task.

His devotion and attention to his men should be without question. There is a very intimate partnership between this junior officer and his men—perhaps the most serious partnership that exists.

It is a life and death proposition and the lieutenant has just got to be good—he cannot let his men down, he must have the answers. If he does not know, he will be more respected if he admits it but gets the answer at the earliest possible moment.

Commanders of every echelon should be good listeners. The lieutenant should question his men to see if they know the reason for things. He unquestionably can learn from them—so can a general. His activities, more than those of anyone else, can promote pride in the organization, which is so essential to high morale in combat or any other work. He, as much as anyone else, under the wise guidance of his superiors, sets the tone of the outfit.

The Company Commander

The company commander is the first administrative man. He is the "Old Man," the father of the outfit. He is probably the last leader in the echelon of command who knows every soldier in his organization.

His administration of supply, housekeeping, and discipline will probably determine, more than anything else, whether it is a happy outfit. To win battles you must have happy outfits when they relax. Organizations that have no cliques, that have a oneness to work together, have a common objective.

The company commander is an outside man—he is not a desk man. While he must supervise all of the paper work, he has a clerk and a first sergeant who are first taught accuracy in administration, and then speed, in order that administration will occupy a minimum of time and outside field work will be the primary interest.

It is essential that the company commander take his lieutenants into his confidence and obtain their active support and enthusiasm for all projects.

It is also essential that the company commander talk to all of his men. This is far better than reading long publications or excerpts to the men. If he expresses to them in easy language the reason for requirements and regulations, his work is more than half done.

It is highly desirable that he intimately know the men of his company. No two men are exactly alike. For this reason, in dealing with them on individual matters they need different treatment. One man needs to be scolded, another cautioned, and a third may need punishment. Most of them need a pat on the back.

Happy is the lieutenant who has an efficient, wise company commander of fine character. He will have a great influence on molding the characters of his younger officers and men. The curse of any officer is to serve under a mediocre man.

The company commander should not only supervise the training and work of his men but he should also supervise, to some extent, their recreation.

The command of a company or battery, if properly accomplished, is one of the most satisfactory positions in a military establishment and, incidentally, is the place where future generals are made.

Higher Commanders and Staff Officers

"The staff officer who serves his commander best, serves the troops most."

The test of a staff officer is whether the best front-line troops, either in battle or work, welcome him because he always helps them.

The general staff officer with troops certainly has an outside job. If he thinks he can perform his duties by sitting at a desk writing memos, he is very sadly mistaken.

Most of his time should be spent out with the troops of the command to which he belongs. He ferrets out their troubles—the sore spots—he anticipates for the future—takes timely action to see that matters are adjusted to meet future events. He can not wait until they arrive—it is too late then. He must anticipate the unforeseen need as well as the planned need.

Any suggestions or corrections should always be made in the name of the commander and not his own. Staff command can be made a vicious thing if several staff officers give orders which sometimes contradict each other; so they must always be fully

aware of the policies of their commander on all matters to avoid any semblance of conflict instructions.

Staff officers should convey to the troops which they visit the feeling of strong support from behind. Build them up instead of tearing them down, advise them, caution them, and correct them when necessary.

The staff group must be loyal to their commander and to each other. Once a staff officer sees a mistake in some department that normally comes under another staff section, he should correct it and immediately inform the head of the supervising staff agency, who in turn should thank him for making the correction. Anything that goes wrong is everybody's business to make it right, to fix it at the earliest possible moment.

Higher commanders and their staffs sometimes withhold information from their subordinates until their plan is entirely completed. This is wrong in principle. The subordinates need all the notice they can possibly get in order to perfect their own plans—to anticipate the requirements for success in battle.

A higher commander should make his subordinates feel his warm support in all of their activities. This is especially important in battle. As long as he keeps the subordinate on the job, that subordinate is entitled to feel that he is fully backed up and informed by his immediate superior.

A fault frequently noted in higher commanders is that they always do all the talking. Many of them are poor listeners. They should listen as well as talk, and they should listen to their subordinate commanders as well as their staff officers.

Frequently a general gets a complex that his staff can do no wrong. He should frequently talk to each member of his staff to ascertain just how that staff officer is representing him. He should permit no staff cliques in his headquarters.

There must be a driving unity of purpose to carry out the commander's decision. The confirmed "yes man" on a staff is a dangerous person. With some commanders it is difficult to be anything else because they do not tolerate any other opinion than one they have already formed.

In general, the commander of a large unit needs all the help he can possibly get, and sometimes his best ideas and plans come from unexpected sources.

The following experience illustrates the proper feeling between command and staff echelons:

In World War I, I was attached for a brief period to the English near Ypres during the darkest period of that conflict for the British. The Fifth Army had just been defeated and almost destroyed in the German Amiens offensive. The chief of the corps staff section to which I was attached had arranged a tour of inspection for me along the front lines north of Ypres. He himself was going back to army during this time to confer with his immediate staff superior.

When I next saw him, he was a changed man. His former hesitant and discouraged manner was changed to a buoyant, determined confidence. He told me in effect, "It is a wonderful thing for me to talk to my chief. My contact with him makes my troubles seem small and inspires me with a feeling of confidence that warms and brightens my entire outlook. After talking to him, I feel that we can overcome any obstacle."

While the above example occurred in a higher command, the relationship illustrated between a senior and his subordinate applies to lower echelons, even to the squad.

The location of the man on foot, struggling forward with the help of artillery, tanks, air, his own supporting weapons, and all the services, is still the gauge by which we measure success or failure.

—General Joseph W. Stilwell, quoted in *Army and Navy Journal* 10 March 1945

Airfield Construction in France

COLONEL BYRON L. PAIGE, *General Staff Corps*
Formerly Director, General Staff Class, Command and General Staff School

THE invasion of France and the subsequent operations necessitated construction of airfields on a scale unprecedented in military history. Some of the experience data resulting from this tremendous program are presented below, based on an interview with Brigadier General James B. Newman, Jr., Commanding General, IX Engineer Command.

CONTROL AND PLANNING

Control of all aviation engineer units was exercised by the Ninth Air Force in order to insure close coordination of all airfield construction effort. This headquarters established the airfield requirements based initially on the tactical air effort, but later on tactical, air-supply, and evacuation needs.

The value of a joint planning staff, which facilitated contact with all echelons of ground and air forces, was particularly evident in the planning of airfield construction. Based on a knowledge of the ground plans and the probable requirements for bases for the air effort, aviation engineer planners were able to plan with considerable accuracy the phasing of aviation engineer units and to fit their movement plans into the long-range plan. They were able also to focus their topographical, geological, and soil-classification studies on the logical airfield sites.

Planning data for such sites were compiled in advance, including studies of seasonal rainfall and elevation of ground water, and the probable airfield construction time was computed for each area for various seasons of the year. Aerial photo coverage was secured for tentative sites chosen on the basis of these studies.

The locations of the airfields to be constructed in the Normandy beachhead were determined in advance from these data, and construction plans were drawn up for each airfield. These plans were subsequently found to conform closely to actual requirements, the greatest change necessitated during actual construction of the first seven being a three-degree shift of axis and a 400-foot displacement for one runway to avoid drainage difficulties.

AERIAL RECONNAISSANCE TEAMS

For subsequent airfield construction, long-range planning data were always supplemented by ground reconnaissance of selected sites. However, in order to utilize ground reconnaissance efficiently it was found advisable to make a preliminary reconnaissance of all possible sites by air, using an L-5 or L-4 plane flown by an air officer familiar with construction problems and carrying as observer an engineer officer trained in aerial reconnaissance. In ten to fifteen minutes over an unfavorable site such a team could definitely reject it; over a good site, thirty minutes usually sufficed to draw up a sketch of the layout and make an estimate of the controlling grades and the amount of clearing necessary.

The aerial reconnaissance team, after visiting a number of sites by air, would direct the ground reconnaissance elements to the most favorable sites. Since a ground reconnaissance team could visit only two sites per day, on an average, this procedure saved so much time that in General Newman's opinion the use of three aerial reconnaissance teams enabled the building of an additional airfield per week.

AVIATION ENGINEER ORGANIZATION

The available battalions were organized into aviation engineer regiments, each with a headquarters company with additional heavy equipment with which to reinforce its battalions. For instance, among the projects being handled by the regiment, one job might require more grading equipment while another would require additional help in clearing and trucking. Battalions were suitably reinforced from regimental pools of heavy equipment according to their needs.

The airborne engineer battalions available in the theater were never used as such. Some of these units were eventually used for maintenance of completed fields.

Surfacing Materials

Of the several types of surfacing materials available, General Newman favored the new Hessian matting where it can be applied to properly conditioned runways. This Canadian-designed, asphalt-coated burlap material, originally intended for surfacing hastily constructed runways, was viewed with disfavor by the British after trials on test airstrips on which only a minimum of grading and compacting had been done. American aviation engineers, however, feeling that the material had merit if applied to a properly prepared runway, continued experimentation. They found that if Hessian matting is carefully applied to a smooth, well-compacted, well-drained runway which is comparatively dry, the resulting surface is comparable to permanent asphalt or cement. It provides far better traction than the mesh or pierced-plank surfaces, especially in wet weather or when compared to either of these types through which grass has grown. It is easier on airplane tires. It is easily and quickly repaired. It is far lighter in shipping weight than pierced plank and occupies less space than equivalent quantities of mesh.

Actual surfacing times for all three types differ only slightly, the major time factor being the preparation of the runway. Either the pierced-plank or the wire-mesh surface can be used over hastily constructed strips and can be laid in rainy weather. The pierced-plank surface has the advantage of structural strength and is therefore more appropriate over soft ground.

In general, however, experience in France indicated that the Hessian matting surface is to be preferred wherever weather, soil, and time considerations permit. General Newman pointed out that in considering the additional time involved in preparing runways for surfacing with Hessian matting, planners should weigh the value of its permanence and better operational characteristics.

Roughly fifty percent of the runways constructed between D-day and D plus 20 were surfaced with Hessian matting; a somewhat smaller number were surfaced with wire mesh, and of the remainder only a few utilized pierced planking, the others being left unsurfaced. After the breakthrough, Hessian matting was used whenever the weather permitted. However, as rainy weather

Construction of runway. (Army Air Forces photo.)

increased with the advent of the fall rainy season there was a decrease in the use of Hessian matting and an increase in the use of pierced planking. In addition, a large number of captured concrete airfields were repaired.

Rate of Construction

Although construction times for individual airfields vary considerably with local conditions, the following data were offered by General Newman to give some idea of what can be expected under average conditions:

1. The build-up of aviation engineer units in France was accomplished over a considerable period beginning on D-day. However, in a little over four months aviation engineers had constructed nearly a hundred airfields. The average field had a surfaced runway 4,500 feet long and 120 feet wide with a 400-foot over-run at either end; about two and a half miles of surfaced taxi-way thirty to forty feet wide, constructed to withstand the concentrated loads of slowly moving aircraft; and "hard stands," each forty by eighty feet, for parking about seventy-five planes. In addition, an average of four miles of two-way service road and gasoline storage facilities for 20,000 to 72,000 barrels of gasoline were constructed for each field.

2. A reinforced company, landing on a beach at the base of the Cherbourg Peninsula at H plus 4 hours on D-day, completed an emergency landing strip before dark. Construction work on this strip was carried on for some time within 400 yards of a German 88-mm battery which apparently was willing to ignore the engineers so long as the engineers ignored the battery. It eventually retired under pressure by our infantry. On D plus 1 the company moved on and began work on an R and R (refueling and rearming) strip, on which project it was to have been reinforced on D plus 2 by the remainder of the battalion. Due to enemy resistance in the beachhead area the remainder of the battalion was not landed until D plus 7, on which date the reinforced company had completed the R and R strip on schedule.

Surfacing an airfield in France with Hessian matting. (Army Air Forces photo.)

3. Semipermanent airfields surfaced with Hessian matting can be constructed under ideal conditions in as little as five days and under reasonably good conditions in ten or twelve days, which allows time for careful grading, compacting, and surfacing. Such airfields have been, in use since early in the Normandy campaign and are still carrying 200 to 300 sorties per day with only minor maintenance problems.

4. Construction times for recaptured fields vary from about two days for those only slightly damaged by bombing or demolition to a maximum of ten days for those thoroughly and methodically demolished by the enemy.

5. Some airfields have been constructed and placed in full operation while still under artillery fire. However, General Newman stated that to his knowledge no material damage to aircraft has been suffered from such fire. In one instance numbers of dummy aircraft were used to draw artillery fire into an unused portion of the field. In another instance, however, a transport field was operating so close to enemy lines that in the third week of operation one transport which circled too wide for a landing was shot down by enemy antiaircraft fire.

6. In a number of instances aviation engineers followed an armored advance and began construction on new sites before the infantry moved up. Ground reconnaissance elements sometimes operated in advance of both armored and infantry lines.

STEEL MESH IS ROLLED OUT TO SURFACE A HASTILY CONSTRUCTED AIRFIELD IN FRANCE. (U.S. ARMY SIGNAL CORPS PHOTO.)

SUPPLY AND EVACUATION AIRFIELDS

Although the question of separate airfields for supply and evacuation had been considered prior to D-day, no provision for such fields was incorporated into the plan. The decision was that such air supply and evacuation needs as arose would be handled through the tactical fields.

The first case of an airfield being used exclusively for air supply and evacuation occurred early in the beachhead phase of operations. Initial plans had called for construction of an emergency airstrip just in rear of the principal landing beach. The aviation engineers were then to move on to the construction of an R and R strip at

another location. The emergency strip was then to be turned over to the Engineer Special Brigade as a dump area.

However, the area for the R and R strip was not captured on schedule, so the original emergency strip was improved to take its place temporarily. This change of plans involved considerable coordination with those responsible for dump construction and was approved only as a temporary expedient. However, when the storm disrupted supply operations two weeks after the landings, the field was further improved and used solely for air supply and evacuation from then until D plus 31.

STEEL MESH IS USED TO SURFACE HASTILY CONSTRUCTED AIRFIELD IN FRANCE. (U.S. ARMY SIGNAL CORPS PHOTO.)

The advantages of a separate airfield for air supply and evacuation quickly became apparent. The difficulty of timing transport arrivals at tactical fields so as not to interfere with tactical missions, the complication of traffic patterns, the inability of tactical fields to handle any large number of transports, the dissipation of transportation when air supply was split between several tactical fields—all pointed to separate supply and evacuation airfields. Such fields can handle up to 300 transports a day during daylight hours and do it far more efficiently than a number of tactical fields could handle the same number even without the operational problems incident to mixing tactical and transport aircraft.

AIR SUPPLY AND EVACUATION COMES OF AGE

The growth in importance of the air supply and evacuation requirements was in General Newman's opinion one of the most significant developments of the campaign. By the time the armies were approaching German soil, supply and evacuation airfields were being set up as separate projects and in a number of instances were being given priority over tactical airfields. One such field was later used to receive all evacuees being sent back to three general hospitals.

An orphan during the initial planning, air supply and evacuation came of age during the campaign in France and has for the first time assumed an adult role in large-scale operations.

The Jap Doughboy and the Japanese Nation

COLONEL EDWARD S. JOHNSTON, *Infantry*, and LIEUTENANT RAY M. STROUPE, *Infantry*
Staff and Faculty, Command and General Staff School

IT is not necessary to search through classified material to get a clear picture of the elements of Japanese infantry tactics. Articles in the press and periodicals, and the conversation of our own people who have fought the Japanese, convey a very definite impression of the main facts so far as they affect our future effort in the Far East.

The basis of Japanese fighting strength on land, sea, and air is the infantry, and the basis for all Japanese land operations and training is close-in infantry combat. The Japanese soldier, sailor, and airman in all categories is first trained as an individual fighter. This training begins with the young boy, as soon as he is old enough to march in ranks, and it never ends. Long before the Japanese youth is ready for specialization as a seaman, an airman, or a land fighter, he has gone through an intensive and extensive course of training in how to be, above and beyond all things, an individual fighter.

This individual Japanese fighter is shrewd, calculating, cruel, unscrupulous, desperate in defense and suicidal in attack, and an expert at all the tricks of the trade. He is well armed with individual weapons and has the close support of crew-served automatic weapons, mortars, small cannon, artillery, and aircraft. He will stop at nothing, and nothing but death will stop him. He is especially adept at individual protective measures and at scouting and patrolling. For the immediate purposes of his profession, he is well educated, for he not only knows what he is doing but also what he is doing it for.

His psychology is the fundamental explanation of everything he does. He is, at base, a brute—a very clever, highly-educated brute, but none the less a brute. He is bound by no rules but the rule of survival and the success of his arms in the service of his Emperor.

Whatever the views of the higher Japanese Command may be, in its political role, as to the usefulness and limitations of Emperor worship, it is none the less a real thing to the Emperor's simpler subjects. However recent or ancient this cult may be, it nevertheless exists for us as a real factor in our problem. The Japanese soldier believes himself to be a member of *the* chosen race, all of the same blood, whose spiritual head is the Mikado, direct descendant of the father of the entire race. The object-in-life of the individual Japanese is to do all that he can do, living and dying, to further the objective of his race—the establishment of its own superiority, under the Mikado's rule, over all the world. If the individual Japanese can further this effort better, at any given time, by dying rather than by living (or if he thinks he can), he is perfectly willing to do it. In fact, he is enthusiastic in his performance of the final act.

According to the best authorities, this inspired beast, be he soldier, sailor, or civilian, assured of the rewards of this earth if he lives to win and equally assured of the rewards of heaven if he dies in the effort to win, will never give up the effort. He will die trying. He will exhaust every resource of body and spirit before he accepts defeat. Nothing but utmost exhaustion, physical and economic, will break him. It is this basic fact as to Japanese psychology which gives us the real proportions of our problem. Whether we are dealing with the individual Japanese, with a squad, a regiment, a division, or the entire nation, this is the basis on which our plans must be made to overcome the defense and to establish victory. Nothing but the destruction of Japanese fighting strength will achieve our necessary ends, and nothing but the destruction of the physical and economic sources of Japanese fighting power will destroy that strength.

Wherever we have encountered this enemy, the story has been the same. He is expert at camouflage and concealment. His dispositions and movement are very difficult to detect. He can shift large forces under close observation without revealing his change in dispositions. He makes the utmost use of ground cover and of darkness. He travels easily over difficult

routes, both by day and night, making use of waterways, paths, trails, and roads. He is equally at home in marsh or on dry land, in the jungle or in the mountains. He exploits local resources to the maximum for purposes of supply and of transport.

The Offensive Concept

Not since the days of the Russo-Japanese War has there been a fundamental change in the Japanese concept of offensive tactics. The attack, stemming from a brief and elastic field order which allows wide range for initiative to the small unit commander, is most often aimed at commanding or critical terrain. Annihilation of opposing forces is desired as a matter of course. Attacking units seek to make their primary thrust at poorly-supported detachments, attempting to encircle the defender in such a manner as to allow him no opportunity for a strategic withdrawal to either flank.

The typical Japanese attack order defines the objective and general plan in lucid terms ("Capt Hamikada is directed to move his company by night to RJ 219, to seize the road junction, and to destroy the enemy in that vicinity.") but most of the detailed procedure is left to the junior officer. Coordination is more a matter of SOP than of specific instructions. The infantry is depended upon for a large measure of cooperation, while the supporting arms are afforded much discretion in their methods of providing support to the infantry.

His preparations complete, the small unit commander stealthily moves his troops to the last covered position on the flank or in the rear of the defending force as his supporting artillery lays down a fire preparation. Gunners attempt to pave the foot soldier's way with successive concentrations of cannon and mortar fire. Then, at a time previously agreed upon, the high-trajectory fire lifts, and the leader launches himself and his men in a swift, howling charge at the enemy position. Overhead machine-gun fire, rounds from the so-called "knee mortar," and hand grenades tossed with vigor and accuracy are intended to keep the defender's head down until the attacking force comes to close quarters. Confronted by wire, the Japanese brings up bangalore torpedo parties in an effort to blast his way through. Should he penetrate the defending lines, he will cling tenaciously to his newly-won ground and attempt by every available means to exploit his gains.

If he is repulsed in an early evening or a midnight attack and is forced to retire, leaving his casualties piled outside the defender's wire, the Japanese will come storming back before dawn to retrieve both dead and wounded. Artillery and mortar fire cover him on such sorties.

Although he is an outflanker by choice and tradition, the Japanese will not hesitate to try a frontal attack if he believes he can more easily achieve success in that manner. Preferring to fight under cover of darkness, he varies his time of attack at will from early evening to midnight to early morning. Occasionally, he will stage a daylight attack, particularly if there is a heavy rain falling. No matter what time of day or night he makes his bid, he will prepare extensively, coordinate his forces, and move unseen to the line of departure before he launches his effort.

In none of his offensive actions has the Japanese used massed armor. It is possible that he has considered the terrain unsuitable for large-scale employment of his mechanized vehicles. However, he has successfully utilized individual tanks and armored cars in reconnaissance and in support of small-unit attacks and counterattacks. On scouting missions, his tankers, although virtually trail-bound, have shown initiative and aggressiveness. In support of attacks and counterattacks, he often attaches an armored vehicle, or several vehicles, to each assault platoon for mutual support.

An integral part of Japanese offensive tactics is the use of patrols—both day and night, reconnaissance and combat—and raiding parties. Of particular note is his employment of the "matériel raiding party." Usually consisting of one junior officer and a dozen or more infantrymen, perhaps supported by a few engineers and signalmen, a party of this type is intended to infiltrate into enemy lines and destroy important equipment, installa-

tions, and supplies. Vehicles and artillery pieces, as well as aircraft and communications wire, are often targets for these raiders. Since raiding parties operate most frequently just before or during Japanese attacks, each has a specific, carefully-chosen mission. Guns and installations, the existence of which might prevent a Japanese victory, are hit with full force. At the same time, however, the party leader will not order the destruction of matériel which he believes he can use for his own purposes.

In order to facilitate his advance through terrain which may be swampy and overgrown by vegetation, or steep and precipitous, the Japanese has shown himself a resourceful field engineer. Utilizing slave labor whenever possible, he has accomplished his missions without placing an additional burden on his extended supply lines. To further his cause he has utilized all the materials of jungle and marsh; he has bridged the streams with native lumber at times, while at others he has used those streams as waterways to his goal. He has not built on a large scale, but he has managed to accomplish much by arduous effort and ingenuity.

Frequently, the Japanese employs aircraft in close support of his infantry attacks, and it is reasonable to expect that he will perfect his air-ground teamwork as the war continues. A strong and flexible antiaircraft defense is an integral element in the tactics of any unit which encounters the Japanese in force.

The Defensive Concept

As any who have fought him will attest, the Japanese in defense is no less a threat than the Japanese in attack. A digger by nature, he will burrow into the reverse slope of a hill, excavate wide and deep tank traps, carve rifle and weapons pits from sandy beaches and rocky plateaus, and strew antipersonnel and antitank mines across the avenues of approach into his position. Once he goes to earth, he is as difficult to find as a woods animal and infinitely more dangerous.

In rolling country, the Japanese prefers a reverse slope position, showing less concern for long fields of fire than for good cover. He rarely uses sizable combat outposts in order to delay his opponent and force him to deploy. Rather, he depends upon a loose chain of individual snipers, armed with small-caliber rifles and smokeless-powder cartridges, to harass the attacking force from close range. He plots mortar and artillery concentrations which will cover the defiles and ravines through which his foe might advance.

On the forward slope of his position, the Japanese customarily emplaces automatic weapons, their crews protected by concealed riflemen. These troops often retire to the reverse slope while their area is under shell fire or bombardment and return to their positions as the enemy infantry approaches. The machine gunners rarely fire until the attacker has advanced within a few yards of the gun position; then the Japanese open up at point-blank range, realizing their opponents are reluctant to continue to use artillery or mortar fire for fear of killing their own men. At times the Japanese have permitted assault echelons to pass their concealed positions, holding their fire until reserve units, moving in more compact formations and offering a more remunerative target, have come within range. Litter bearers and aid men following the advance elements have not been exempt from these ambushes.

Within the area he has selected for his most determined resistance, the Japanese digs like a ferret. He braces his emplacements with logs and wire, providing overhead cover by the use of steel, concrete, more logs, and several feet of earth. Frequently, he has dug in tanks, individually, for use as "pillboxes"; however, his contrived positions are fully as resistant to gunfire. An emplacement so constructed is calculated to withstand anything except a direct hit by an aerial bomb or a sizable artillery shell, and frequently pole —or satchel—charges are required. Even after the walls are crushed, the exits are blocked, and he knows his foe is probing the ruins with flame and steel, he will lurk in the debris, determined to sell his life dearly. Only when he has expended his final cartridge and the end is imminent will he start the fuze on his last grenade and hold it against his body, almost cheerful in the hope that his nearest

attacker might suffer some of the impact of the explosion. American forces on at least one operation sustained heavy losses while capturing positions which had been virtually destroyed by gunfire, for in some of the ruins one or two survivors still clung to life and the urge to kill.

Although there may have been instances wherein the defenders of emplacements in these hard cores of resistance had not thoroughly integrated their defensive fires—times when there were costly gaps in the final protective lines—the attacker cannot count on encountering such good fortune in the future. The Japanese, doubtless an imitator but surely a diligent one, can be expected to improve with experience. The principles of his defense have been taken from the best foreign sources. He cannot always achieve the ideal in a particular locality or on a particular occasion, but he will never cease trying.

If it appears that his key positions are being overrun, the Japanese will not hesitate to saturate these areas with rounds from mortars and artillery pieces concealed to the rear. His infantry cannon he also uses to bolster his defense, and he may employ his artillery singly or in battery as a reinforcing agent. However, as in the attack, the infantry provides the true framework—the artillery supports.

Even when all positions are completely overrun and the last main-line defender is liquidated, the attacking force cannot be assured of a permanent tenancy. Troops must dig in firmly to resist the well-nigh inevitable counterattack—an integral part of the Japanese defensive plan. The counterattack is launched by mobile elements of all sizes and at any time believed calculated to produce the best results. Though much has been written to make the reader believe all Japanese counterattacks are ill-coordinated "Banzai" rushes, such generalization is dangerous and inaccurate. Though some counterattacks are staged against overwhelming numbers by a few desperate men, larger, well-planned efforts are equally customary. It is only when death or capture seem the only alternatives that all available personnel—even the walking wounded—are thrown into a final "suicide charge." Surrender here is unusual—these charges are for keeps.

The Psychological Factor

If the Japanese military mind seems to work simply, it nevertheless is capable of psychological subtleties. The Japanese understand the need for "psychological warfare," and they employ it. Their methods may be crude (many reports have it that they are) but the Japanese unquestionably work hard at this method. Yells and squalls of hatred, intended to frighten the foe, are quite the usual thing to be expected from the fighting Japanese. He howls like a beast, brandishes his weapons, makes threatening and obscene gestures, and employs American profanity and obscenity for a like purpose. A certain elementary simplicity in technique, aimed along direct lines at certain obvious objectives, is typical of him psychologically as it is in his physical tactics.

All in all, on the basis of the record, the Japanese has rapidly lost the initiative in the Pacific, and has been forced off balance and kept from regaining his stance throughout the step-by-step advance, from its beginnings in Guadalcanal and New Guinea. There is evidence for believing that he lacks the native initiative and resourcefulness of the American. However, his higher Army Command has never been accurately estimated on the basis of such a test. His Navy has been outfought and outmaneuvered, but mass action of his land forces in great strength against large Allied land forces with play for maneuver has yet to come. It is too early to predict what his shortcomings, if any, may be in this titanic struggle.

One theory is that the Japanese higher command is "feudal" rather than truly professional in a military sense—that it has been built up on the basis of politico-military pressures rather than on the basis of true merit, and that it cannot compete, on an equal basis, with the American Command. This is a hopeful thesis. There is evidence to support it, but only time will tell.

Certainly, the Japanese infantry being the esssence of the Army and of the nation, the student can get a quite accurate idea of the nature of the ruling Japanese mind (the mentality of the ruling military clique) by analysis of Japanese infantry procedures. If peoples are to be judged, as Mr. Lippmann says, rather by what they do than by what they say, then the Japanese rulers and ruled, alike, as exemplified by their infantry troops, are desperate fighters who will exhaust every resource before they commit suicide in the face of failure. They will use every available weapon without compunction, abstaining from any act or practice only because of fear of consequences, not to themselves personally, but to the success of their cause. They will act with careful preparation, stealthy approach, and daring execution.

What they have of resources they will use to the utmost. If they lack versatility and fertility of mind, they will spare no pains in the refinement of technique to perfect the methods which they are clever enough to copy from others. They will contest every inch of the struggle, and will be most dangerous when they cannot be seen, cannot be heard, and cannot even be smelled. If they have been, so far, defeated at sea, it is not because they have failed to seize upon opportunities and to make repeated daring efforts to capitalize upon them. They are never done till they are dead.

The same motif of thought, feeling, and action runs through every effort the Japanese have made, by land, sea, or air. If their psychology is simple (and it probably is) it is easy to understand only when one has attained a certain perspective. It may be that the very crudity of Japanese thought and feeling has been responsible for the inability of our people to assess possible results on a real basis. The American mind may have been unable to credit the Japanese mind with so much simplicity of error. Or it may be that the American mind is now unable to credit the Japanese mind with so much flexibility as it really possesses. In any event, it is the mental factor in the Japanese totality of fighting strength which all estimates now tend to assess as likely to be decisive.

The sum-total of all public estimates of the Japanese is that his power will never break, his material resources will be less than ours but great enough to cause us a maximum effort, but that there is a question whether his mentality is equal to the task ahead of him. On the basis of our encounters thus far with the Japanese infantry—epitome of the Japanese nation—it can be said that certainly there is a question here, but, as to the answer, it is too early to give a negative reply. Action must properly be based on the assumption that the Japanese tactical mind will put up a real struggle.

Tenth Army—"All Service"

Digested at the Command and General Staff School from an article in *Army and Navy Journal* 7 April 1945.

THE newly organized Tenth Army is the latest development in fighting organizations.

The new army embodies many advanced developments growing out of studies of the actions thus far in amphibious warfare as well as forward-looking ideas which may result in revolutionizing military organization.

Apparently all services are represented within the Tenth Army. It is known that the army has a naval officer as deputy chief of staff. Also known is the fact that both Army and Marine troops compose the ground fighting units—the XXIV Corps and the Marines of the Third Amphibious Corps.

Dispatches from Pacific headquarters also indicate that the commanding general has air elements under his command, probably directly integrated with his organization.

It is possible that the new organization may be in the nature of a test force looking toward even a closer integration of all fighting components in field units.

Reduction of a Strongpoint in Luzon by I Corps

MAJOR GENERAL INNIS P. SWIFT
Commanding General, I Corps

SAN Manuel, Luzon, is a typical small Philippine town, with a steeply banked stream to the east, drainage ditches lining the north and south sides, and the spur of a ridge running northwest-southeast abutting its northwest corner.

Approaches from all sides, with the exception of this corner, are flat and open, and there is excellent observation from the southwest corner of town to the west and south. Vegetation is thick in the outer quarter of the town, with frequent clumps of bamboo twenty to thirty feet in diameter at the base.

An estimated six hundred Japanese troops of mixed arms and units manned the defenses of San Manuel; many were service troops. Approximately forty medium tanks and five light tanks were in the town, and there were six 105-mm howitzers with prime movers, seven 75-mm cannon, two 47-mm antitank guns, fourteen machine guns, and nine knee mortars.

This armament was disposed primarily to the westward and southwestward, in the face of I Corps forces attacking to the east. Though concentrated on the perimeter, weapons were disposed in depth for all-around defense, and at least one-third of the tanks

were kept in mobile reserve in the south-center of town.

The dismounted defense was fluid, moving according to indications of impending attack and withdrawing during harassing fire to dug-in positions at the southeast and northeast corners of the town. The spur to the northwest was unprepared and unoccupied except at the peak of the ridge, about two miles above the town, where an estimated platoon held an entrenched outpost; approximately one squad held a detached outpost in a barrio 2,000 yards from the town along the south edge of the ridge.

The enemy fieldworks were complete and of long standing; their principal feature was the revetted emplacement. There were seventy-five of these, facing to cover all avenues of approach. Each was made with vertical sides, just wide enough for a medium tank with about one foot clearance on either side, and revetted to a height of thirty inches. Around each were rifle pits of standard Jap type and a covering machine-gun emplacement. Most of the rifle pits were covered, and all emplacements were camouflaged.

The Attack

The attack on San Manuel was made by

the 161st Infantry Combat Team (less 3d Battalion), commanded by Colonel James L. Dalton II, Infantry, with Company C and one platoon of Company D, 716th Tank Battalion, and Company D, 98th Chemical Mortar Battalion, attached.

A secondary effort by the tanks and the 1st Battalion, 161st Infantry, less one rifle company, was made against the southwest corner of the town, and the main effort was made by the 2d Battalion against the north edge of the town. Prior to the attack, one rifle company of the 2d (?) Battalion had been emplaced on the spur ridge northwest of the town.

The secondary attack jumped off at 0715 on 24 January, following a fifteen-minute preparation by the 25th Division Artillery, with the infantry closing to within 300 yards under the artillery. It reached the southwest corner of the town, where the tanks were halted by the drainage ditch and by antitank fire from their front. The infantry deployed to protect the tanks, and came under aimed small-arms, automatic weapons, and mortar concentrations from the west and south ends of the town. The effort made no further headway, and six M-4 tanks were put out of action, one in attempting to hurdle the drainage ditch.

The attack was renewed at 1400, but still gained little headway, and at dusk our troops withdrew to covered positions 200 yards west of the town.

The main effort jumped off at 0725. The right company failed to reach the edge of the town because of sniper fire enfilading its approach along the south side of the ridge, but the left company, which had reached the north edge of the town under the artillery preparation, penetrated about fifty yards. There it was halted by machine-gun crossfire, then driven back out of town by a prompt counterattack led by three tanks.

After a regrouping, the attack was renewed at 1700 to take a limited objective, the northwest quarter of the town. The attack was preceded by a five-minute preparation of 105-mm artillery, and during the afternoon a road was bulldozed along the south edge of the ridge and two platoons each of cannon and 37-mm antitank guns were brought up in support.

The objective was secured against negligible resistance, but upon consolidation our troops received heavy automatic and rifle fire from concealed positions to the front. Both assault companies received point-blank machine-gun and rifle fire, and 47-mm fire from five tanks facing them, three of the tanks dug in.

Self-propelled mounts and 37-mm antitank guns were promptly pushed up with the front-line troops, and eliminated the Jap direct fire. That night one M-7 self-propelled mount was destroyed in a suicide attack with a magnetic or lunge-type mine.

Superior fire discipline and suicidal tenacity marked the conduct of the defense. Except for deliberate sniping, defensive fires were held to a range of fifty to a hundred yards, and reserved for remunerative targets.

25-27 JANUARY

For the succeeding three days, operations consisted of a block-by-block advance to the south through the town, with the main effort still on the left. Threats to apparent key points of terrain within the town evoked no reaction from the defenders, but repeated small-scale counterattacks were made in attempts to retake the ridge northwest of town. A total of ninety-eight Japs were killed in these assaults.

Elsewhere, the Jap remained in position and let the attackers come to him. Due to routine movement of the enemy's tanks under cover of darkness, it was impossible to tell whether they were shifting the positions of dug-in tanks or warming up reserve tanks. In the daytime there was no visible movement of men or armament.

On 26 January the bridge and the road leading east from San Manuel were taken without opposition. That night, the 1st Battalion was withdrawn from the right flank and placed on the left front, and on 27 January a coordinated attack on a two-battalion front was made against the southern half of the town. It was preceded by a 105-mm prep-

aration of two battalions, and supported by a similar concentration advanced by time schedule. Though several tanks were destroyed, there were no gains of more than 100 yards. Casualties were heavy and fatigue was becoming apparent in attacking units.

BANZAI!

About 0100 28 January, the Japs, after a great deal of preliminary maneuvering, launched an attack with thirteen tanks. The point, a salient made by the left company of the right flank battalion, was well selected.

Normal barrages of artillery and mortars were called down, but did not stop the enemy. The tanks assaulted in waves of three, each tank followed closely by foot troops, from a position 100 to 150 yards from our foremost elements.

Riflemen in pits opposed them with antitank rifle grenades, bazookas, and caliber .50 machine guns, and two 37-mm guns had the tanks within range. Hits were scored on the first wave of tanks, but they overran our forward positions, spraying blindly with machine guns and firing their 47-mm guns point-blank.

Two antitank guns about thirty to fifty yards in rear of our forward elements fired on the waves in turn. Ten tanks in all were halted, the leading one just fifty yards inside our front. All had been hit and penetrated many times by everything from caliber .50 slugs to AP shot. The last three tanks left the assault position and withdrew to the eastward, out of town, without attacking.

On the morning of 28 January we renewed our attack, and only negligible opposition was encountered. The town was secured at 1335 hours.

CRITIQUE

The mission of the defense at San Manuel appears to have been simply to deny and destroy; the town could, at any time, have been bypassed to the south and cut off. Further, no noticeable effort was made to hold the eastern exit of the town, so that after three days of the fighting, all types of traffic could pass unimpeded through the north side of town.

Defenses of the town were well conceived; the one flaw was failure to occupy and defend the ridge about the town.

The earthworks were well done, and designed to foil artillery concentrations. Personnel shelters were of the spider-hole type, and many added a small horizontal recess at the bottom to minimize the effects of time fire. Direct hits were required on both personnel and matériel.

The combination of tropical vegetation and empty lots within the town made tactical classification of the terrain difficult. It was hard to determine, too, where the clearings had been made for fields of fire by the Japs and where the burning and blasting had been done by our forces. But the enemy took full advantage of remaining cover, and utilized all open space as fields of fire.

In repeated instances the enemy permitted small reconnaissance patrols to traverse areas and return; when combat patrols entered such areas they were met with heavy, well-aimed small-arms fire. In one instance a strong combat patrol was allowed to enter the edge of town unopposed; upon beginning its withdrawal it received heavy casualties from snipers concealed along the withdrawal route.

Communications between Jap-defended towns are poor, either through lack of equipment or through a disinclination to pass on bad news. The defenders of towns in Luzon have repeatedly been unaware that an adjacent town has fallen, and this was more than likely the case in San Manuel.

CONCLUSIONS

There is no quick, easy, or sure-fire method to reduce a fortified tropical town with minimum loss of time and life. But based upon experience at San Manuel, the following points seem sound:

1. Get stero-pair photos for wide distribution and study prior to the reconnaissance phase.

2. Make air reconnaissance of the town and its approaches; assault battalion commanders should participate.

3. Make prompt, close-in ground reconnaissance to locate weapon positions, fields of fire,

defenders' reactions, etc. Maintain patrol contact and surveillance of all critical points.

4. Soften up the town by repeated airstrikes, using high concussion (depth charge type) bombs, and incendiary bombs to burn off cover. Fire 155-mm artillery both day and night for destructive effect, and 105-mm at night for harassment. Pay special attention to probable personnel dispersal areas at the outer edges of the town and along stream banks. No artillery of less than 155-mm is satisfactory for destructive fire; concussion is needed against personnel and a heavyweight shell against dug-in matériel.

5. Mount an attack to establish a "beachhead" in a portion of the town. The preparation should consist of an airstrike of concussion bombs followed by incendiary bombs. This should be followed instantly by a ten-minute artillery concentration using 155-mm or higher caliber with high-explosive shells, and all lower calibers with time fire. Infantry direct fire weapons should neutralize any suitable targets. Under this preparation, plus any necessary smoke screening, the infantry should advance to within 300 yards. At that point the artillery should begin to shift out by 100-yard bounds on call, and infantry weapons should take over close fire support to advance riflemen to assault distance. When the infantry fires lift, the riflemen must close with the bayonet; to hesitate in front of Jap defenses is to invite heavy casualties.

6. Infantry self-propelled mounts and antitank guns must move by bounds close to assault troops, and when the attack has secured its objective, consolidation must include prompt emplacement of antitank weapons with forward rifle elements. Except for urgent reasons, self-propelled mounts should be withdrawn to secure rearward areas by dark.

7. From the initial assault to the conclusion of the attack the operation should consist of driving in one or more salients as if with a crowbar, and prying right and left to crack the position, block by block. Each bunker and each dug-in tank presents an individual problem, and a coordinated attack of a unit larger than a company breaks up into isolated assault operations by units of company and platoon size. Special assault tactics employing smoke, bazookas, and flame throwers offer the only sound solution. Whether or not to utilize darkness depends on the state of training of the attacking troops.

8. It is unsound to set a terrain objective for an assaulting unit from a map or photograph. The objective should be the destruction of a position. When a terrain feature is designated it may turn out that the ground may be taken without opposition, but that it is untenable and useless to the attacker because it is dominated by aimed fire of the defender.

9. The self-propelled infantry howitzer is the most efficient weapon in the regiment for this type of operation. Employed singly as assault guns, the mounts should be held in a ready position in the nearest cover to the rear of forward elements, then moved forward to firing position when scouts have located the target and the howitzer section leader has made reconnaissance. The mount can cover itself with its caliber .50 and caliber .30 machine guns.

10. Tanks are of doubtful value in an assault on a fortified town. They are vulnerable crossing open approaches, and even more vulnerable once in the town. Their best use is as individual assault guns. The antitank gun is the most effective defensive weapon. The one disadvantage of the bazooka is that it draws fire at night with its flare-back. The rifle grenade is very efficient, and the caliber .50 machine gun is most effective at poirt-blank range.

11. As soon as possible, the town should be bypassed, and forward operations carried on concurrently.

The Trials and Tribulations of an Army G-4

COLONEL CHARLES S. D'ORSA, *General Staff Corps*
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THE Staff Officers' Field Manual outlines G-4 functions and responsibilities. Army school courses amplify these functions, fitting G-4 in as one of the cogs in the headquarters staff, portraying his role by means of demonstrations, problems, exercises, etc. The principles laid down in the Staff Officers' Field Manual and stressed and amplified at the Command and General Staff School all provide the necessary solid foundation upon which to start a G-4 upon a career in that field. There is one requirement that might well be added to all of these principles and which should be more emphatically stressed—the utilization of common sense. A G-4 stands or falls upon his sound application of plain, ordinary common sense to the everyday problems confronting him.

To furnish a more concrete idea as to what a G-4 actually does, let us review the experiences of General Mark W. Clark's G-4 from the birth of his army 'midst Moroccan splendor and the chaos of the Tunisian campaign to its position high in the Apennines overlooking the lush plains of the Po Valley.

The first large-scale American contribution in men and machines in World War II —the landing in North Africa—was barely two months old when the decision was reached to form the Fifth Army Headquarters, with General Mark W. Clark as its Commander and Major General Alfred M. Gruenther as its Chief of Staff. The immediate problem facing the Army Commander was how and where to obtain the personnel to form his staff. The II Corps, which a month previously had been known as the "Center Task Force," was actively engaged in the Tunisian campaign, while the I Armored Corps, formerly the "Western Task Force," was busily licking its wounds and reorganizing its units after the Moroccan campaign. Both of these headquarters were called upon to furnish personnel to form this army staff. Its purpose in life was a matter for conjecture. However, it was well understood by all concerned that the war would not be won by an African campaign alone.

The Commanding General took every opportunity to train his staff in certain basic principles which were applicable to the creation of a smoothly working staff, regardless of the functions each individual staff member had to assume. His organizational motto was "I want my headquarters to be a happy one."

Fifth Army Headquarters was indeed fortunate to have had an opportunity to get organized and established during a period when its mission was a training one only. From the date of its inception early in January 1943, up to the landings on the Salerno beaches in September 1943, its mission was to train units for amphibious operations and make the necessary plans for the launching of such an operation, where and when not being known at the time. There was a literal parade of training centers that had to be established, operated, and supplied in order that Fifth Army's anticipated mission could be accomplished. It was during this period that G-4 literally made "something out of nothing." The "nothing" refers to the fact that equipment for these training centers was almost impossible to obtain because of the demands of the Tunisian campaign.

When the fateful day arrived on which General Clark received his mission to start planning for a large-scale amphibious operation "somewhere on the European continent," his staff was a closely-knit, happy family trained in the principles and policies the General had so ably implanted in the minds of its members. It was at this time, when all operations hinged upon transportation, that it was decided to organize and establish a seventh army service—the Transportation Section. It was decided to place all quartermaster truck units under this section for operation and administration. This section was to control all army transportation facilities—initially motor, later rail,

and whenever necessary, shipping. This was a distinct departure from the normal setup. From its organization prior to the Salerno-day landings to this date, there has been nothing but praise for the outstanding accomplishments of this section in moving the supplies for the army. The operations of the Transportation Section is a story in itself and cannot be adequately covered here. The advantages of this setup were beyond all expectations. It gave G-4 a centralized control over army transportation. Transportation responsibilities were widened progressively until they included highway marking, highway patrolling (which resulted in timely reporting of washouts, weakened bridges, wrecks, and even the location of many local resources noted in their travels), centralized vehicle maintenance, and simplified administration. This is one of the outstanding innovations in staff setup within an army headquarters of which Fifth Army is justifiably proud.

The planning required by Fifth Army for the anticipated operations in various parts of the "soft underbelly" of Italy was so extensive that General Clark wisely decided to divide his staff by forming a small nucleus of officers experienced in operational planning, who were relieved of all other duties. G-4 included members from each of his divisions. Each special staff section also had representatives who worked as part of the team with the G-4 members. Many plans, most of which it was discovered later were cover plans, and hundreds of revisions were made before the group was called to Algiers to work in closer liaison with the Commander in Chief, Allied Force Headquarters, and his staff for the real thing. The planning group was bedded down in a well-guarded area in the suburbs of Algiers and was given its directive to plan for the invasion of the mainland of Italy.

The Sicilian campaign at this time was rapidly drawing to a close. The planning group was faced not only with the problem of mounting an amphibious operation from four separate major ports stretching from Casablanca to Bizerte, including Palermo, Sicily, but with absorbing and integrating the additional problems incident to having British units under its command. This was to be an Allied operation. The G-4 angle involved a tremendous volume of detailed work and was infinitely complicated by numerous changes in troop lists and tactical decisions as to employment. To complicate the matter further for G-4, the number, size, and type of ships to be employed were not completely firmed until the date of embarkation. The G-4 and the army services were seemingly in a whirlpool. Some people referred to it as a "merry-go-round" with the brass ring alternating between G-3 and G-4. Decisions, which fluctuated constantly, had to be made concerning what troops were to comprise the operation, what peculiar equipment was to be furnished these troops in the light of experience gained from the African and Sicilian campaigns, what ships were to be available, whom to load on what ship and when, what supplies were to be taken, what schedule was to be followed for the arrival of these supplies at the beachhead, and last but not least, when the operation was to be launched.

The work of G-4 separated itself into two very distinct tasks: first, detailed calculation and interpretation to determine ability to support each proposed operation along with the revisions and alternates thereto; and second, the actual mounting of the troops and supplies—the preliminary stages of which took place simultaneously with the final planning. Another difficult problem involved the integration of the requirements of the British Army, Royal Navy, U.S. Navy, and U.S. and Royal Air Forces. It was found necessary to have as part of the planning group a British counterpart. This was known as the "British Increment" with Fifth Army Headquarters. It was also found necessary to bring a portion of the base section staff which was to establish the base section in the new zone of operations. Towards the end of the planning, the G-4 office included G-4 British and a base section G-4. The enormous proportions which this contemplated operation began to assume necessitated complete decentralization of detail work. The experience

gained by the staff in its seemingly quiet period in Africa bore fruit at this critical time.

Although army headquarters accompanied the assault convoy, the landing was entirely a VI Corps responsibility. On the supply side, the landing consisted of the unloading operation, the establishing of dumps and issuing therefrom, and the bivouacking and utilization of service troops. It might also be noteworthy to bring out the system adopted for supplying the British forces operating under Fifth Army. The army British Increment not only had the army G-4 counterpart ("Q" Branch) but also all the necessary services with attendant responsibilities. This increment assumed full responsibility for supplying the British forces. This was necessary because of the distinct and separate source of supply for British formations. Although the corps staff did a marvelous job in supplying the troops over the beaches, it was invaluable to have the army staff available to assist. The army staff was fully acquainted with the complete plans for the operation, and as critical developments occurred due to the intensity of the German determination to drive us back into the sea, the army staff lent valuable assistance. It was during that memorable vicious counterattack launched against the Sele River sector between 12 and 14 September that urgent calls came for certain types of ammunition. Because of rough seas at the time, it was impossible to unload ammunition fast enough to meet all demands. For the first and only time it was decided to fly in supplies. Staff procedures were so well set up that by noon following the day the decision was reached to have this ammunition flown in, trucks were being loaded directly from the C-47's which brought it in.

By D plus 12, army decided that it could relieve VI Corps of the supply burden since our services were on hand. Army took over beach operations, which included the unloading of ships, movement of supplies into dumps, and operation of dumps. This was all accomplished with no interference to the continuous supply of the troops.

Another incident worthy of note which occurred during these hectic days was the placing in operation of the rail line which was found close to the beaches and which ran through Paestum. An aggressive member of the Military Railway Service, who had accompanied the army as a part of the base section contingent on D plus 2, had located a good stretch of track and a number of box cars. With marked ingenuity he utilized two 2½-ton trucks and, by replacing the rubber-tired wheels with flanged railway wheels, he established motive power for the movement of rail cars and started operation of the first Fifth Army railway in Italy. Fifth Army had its first railway in operation moving supplies from the beaches to initial dumps in less than six days after the first doughboy set foot on the mainland of Italy.

Upon the fall of Naples, the Fifth Army Base Section, which was under direct operational control of G-4 Fifth Army, moved into the port area with the mission of clearing this almost completely destroyed and devastated port in order to start unloading the follow-up supply convoys. During the interim, the supply of Fifth Army was continued over the beaches of Paestum. The army services furnished material assistance to the base section services in locating and establishing their depots in and around Naples. At the same time, army base dumps were established in the Caserta area from which truckheads and ASP's (ammunition supply points) were stocked. By 1 November, the condition of the port of Naples was such that it was decided to relieve Fifth Army of all responsibility for port operations and for calling supplies forward from African base ports. The Peninsular Base Section (PBS) was established as part of the zone of communications under direct control of SOS NATOUSA. The supply system that went into effect was that PBS would stock base depots and deliver supplies to the army base dumps. Army depots for Class I, II, III, and IV were established in the vicinity of Caserta with the ammunition depot at Aversa. It was decided to maintain a fifteen-day level in the army depots, from which the army

services would supply truckheads and ASP's behind the combat troops. Another army policy established at this time was that truckheads and ASP's of Class I, III, and V supplies would be maintained as close to the fighting troops as possible. In no case would the divisional truck turnaround time be greater than eight hours. In most instances truckheads and ASP's have been located anywhere from three to twenty miles from the front lines. This policy has guaranteed full logistical support of combat elements at all times.

The greatest problem which confronted Fifth Army logistically at this time, and which has continued since, was the problem of transportation. The Germans methodically destroyed all rail lines in such fashion that complete rebuilding was necessary, and at the same time they thoroughly demolished bridges, culverts, etc., on all usable roads. The Fifth Army engineers were able to reopen roads with the expenditure of much time and labor. However, required railway construction was such that Allied Force Headquarters established the Military Railway Service as a separate entity to rebuild and operate this means of communication. In most instances, since the beginning of the Italian campaign, the supply of Fifth Army has been solely dependent upon truck transport. There have never been sufficient trucks to meet all the demands. Although it is a base section responsibility to deliver supplies to the army, Fifth Army has had to utilize some of its assigned transport to haul supplies from base depots to the army depots and from army depots forward to truckheads and ASP's because of overall theater truck-unit shortage. Fifth Army transportation has utilized a daily average of 1,374 trucks, which have operated a monthly average of 6,874,154 ton miles.

Fifth Army supply problems were increased with the arrival of U.S-equipped French troops. Due to the difference in language, a "French Increment" was incorporated in the army headquarters, with a G-4 counterpart set up in the G-4 section. The functional operation of the French Increment G-4 concerned the supply of French units with items peculiar to French forces. Wine, cigarettes, and Moslem rations were a few of the typically French supplies. The G-4 portion of the increment also performed liaison functions between G-4 Army and G-4 French Corps on other supply matters. At about the same time an Italian motorized group was assigned to Fifth Army, and had to be immediately prepared for combat. Although this unit was to have been completely equipped when it arrived, it was found that equipment and supplies available would sustain them in combat for a period of not to exceed a week. Stocks of Italian supplies, specifically ammunition and clothing, were practically "zero" due to the fact that the Germans had cleaned out all established depots. The combined efforts of army services, PBS, SOS NATOUSA, and AFHQ, which entailed reclamation of previously captured Italian supplies stored in North Africa and their shipment to support this poorly equipped unit for combat, resulted in partial success. Here again it was necessary to establish an "Italian Increment" in the army headquarters with representation in the G-4 section and with the services. At the same time, Italian service units were furnished Fifth Army, which were utilized in the majority of cases as labor to assist the services. This international scope which Fifth Army assumed made supply matters a veritable deluge of headaches for G-4.

Combat over relatively flat terrain had now changed to fighting in rugged mountains. Winter was upon us with attendant snow and rain, resulting in mud. The army literally bogged down in a sea of mud. Although blankets and normal woolens had been issued to the troops, they were found totally inadequate to provide the necessary protection from the elements, particularly for forward troops. Overshoes, which were late in arriving, were distributed on a priority basis, first priority going to the combat troops and much later to the service units. Many cases of trench foot developed, attributable in part to the lack of replacement socks. Extra shelter halves were issued to each individual to preclude sleeping in direct contact with the soggy ground. The inadequacy of the then

prescribed winter uniform was such that General Clark ordered the issue of combat suits to all front-line troops. This was an item of wear exclusively reserved, up to this time, for armored personnel. By this action, front-line troops were made more comfortable and many lives were saved. All stocks in the theater were issued.

By December the tactical stalemate was such that the decision was reached to try to force the withdrawal of the enemy's forces from his strongly-held positions along the Garigliano River and the Cassino front by launching an amphibious operation against his western flank just south of Rome. This was known as "Operation Shingle." Again a separate planning staff was set up to plan for this operation. Experience gained in planning for the initial invasion of the mainland stood us in good stead. The problems involved were exactly the same except for one important factor. The operation had to be supported over open beaches, except for the possibility of developing the port of Anzio to a greater capacity than it had in peacetime. The port of Anzio offered no alongside berthing facilities and the estimated maximum rate of discharge based on peacetime usage of the port was 400 tons per day. This limiting factor on supply unloading at the beachhead area precluded planning for any rapid build-up of forces. The naval estimate of the situation guaranteed no more than an average of two days out of each seven days of sufficiently good weather to permit unloading operations over the beaches. Everyone concerned fully realized the grave risks entailed in launching such an operation in the middle of winter at the height of poor weather conditions, especially from a naval point of view.

Army G-4, realizing all the problems involved, and especially considering the lack of unloading facilities at the beachhead area, originated a scheme for rapid discharge of supplies from LST's which was novel and unheard-of up to that time. This proved to be the savior of the Anzio beachhead. The idea was to load 2½-ton trucks in Naples with supplies, back these trucks into LST's, sail them to the beachhead area where "hards" would be developed so that trucks could be run directly from the LST to the dumps, and load the empty trucks back on the LST's for return to Naples. In this manner, each LST, although not carrying its maximum capacity, would insure a rapid discharge and delivery of a minimum of 200 tons of supplies.

Again, "Operation Shingle" was a corps show, and again, to complicate further the logistical problems, it was an Allied operation with two British and two American divisions comprising the force, all under command of the American VI Corps. On 22 January, "Operation Shingle" was launched over the beaches south and north of the resort town of Anzio. The initial seizure of the beachhead area was accomplished without too great loss of life. The enemy's reaction, however, was fast and furious. He realized his predicament and rapidly moved divisions from northern, eastern, and western Italy to meet this threat. However, he did not weaken his southern front materially.

In view of the critical situation thus created for the Allied beachhead forces, General Clark decided to establish an advance command post on the beachhead in order to maintain closer contact with the VI Corps and to deal more effectively with the problems that arose. In actuality, it was an army liaison link between the corps and the main army command post. However, the supply problems were of such great magnitude that General Clark decided to relieve the corps of all responsibility for port and dump operations—in effect, relieve the corps of the supply problems involved. Army G-4, realizing the scope of his overall supply problems, decided that his executive should represent him at the Anzio beachhead and handle all supply problems at that end. To increase the difficulties, the only means of communication were radio and cub plane courier service whenever weather permitted. The advance command post opened on 29 January with G-4 represented by his executive and a clerk. On 6 February at 1800 hours, which had been the hour as of which all daily supply status reports were made, the army relieved the corps of its entire supply burden. To assist the executive, a G-4 officer of the

Transportation Division of the G-4 section and a lieutenant from the Transportation Section of the headquarters along with two additional clerks were furnished. Some army services sent staff members from their sections while others designated staff service representatives from their service units then on the beachhead. Due to the limited space and the desire to keep the command post as small as possible, staff service representatives stayed in bivouac areas of their units. Although this is not the approved staff setup from a G-4 point of view, there were many reasons that brought about this decision.

The beachhead command setup was such that army G-4 representative had to be not only a tactful diplomat but also a forceful and aggressive operator. In effect, the army G-4 and his service representatives and service units were "guests" in the corps zone of action, since the area was too limited to prescribe a corps rear boundary. Army G-4 representative had to supervise, coordinate, control, and direct the functions of the engineer combat regiment which was operating the beaches and the port, as well as the Navy, which was operating and controlling movement of Liberty ships, LST's LCT's, LCM's, and other unloading craft to assure supply of the beachhead forces. Because of the British units which were on the beachhead, a British Increment was attached to the advance command post.

The maintenance of this beachhead for approximately four months in the face of constant and determined efforts of the enemy to dislodge this thorn from his side will go down as an epic in military history. The story of Anzio is definitely a matter for separate discussion. However, a few salient functions of G-4 should be pointed out because the supply and the maintenance of the beachhead forces over such an extended period under constant enemy attack has been without question the outstanding supply accomplishment of this war to date.

On the port operations side, the Navy's estimate of only two good unloading days per week was not far wrong, because during the four months' period the average good unloading days were four per week. Enemy air attacks were "round-the-clock" affairs. Shelling, utilizing 88's, 170's, 210's, and 280's, was so constant that anything that moved on the beachhead area or on the shore line adjacent thereto was never safe. Shell fire forced the Liberty ships to keep backing out to sea, until one day they were anchored seven miles off shore, which prevented the use of Dukws for unloading operations and made the LCT and LCM turnaround so long that tonnages unloaded were almost negligible. The G-4 representative had literally to "take the bull by the horns" and force the issue with the local naval officer in charge to keep ships close to shore.

In addition, more troops were required to stem the exhaustive efforts the enemy was expending in trying to drive us from the beachhead. In order to permit more troops on the beachhead, it was necessary to increase the tonnages being unloaded. Everything possible was done, even to the utilization of LCIL's, which could only carry twenty tons of supplies on their decks at the most. Such items as barbed wire, pickets, mines, sandbags, all became critical items, the need for which far exceeded the availability.

The role at Anzio had changed from one of an offensive mission to one of stubborn defense to hold what little we had. The LST-truck turnaround system proved its weight in gold. Due to weather conditions all beaches had to be abandoned and the small port of Anzio had to bear the full brunt of the tonnages required to be unloaded. Ammunition for artillery and antiaircraft units presented the biggest problem and the LST turnaround was utilized extensively for this purpose.

The decision problem which every G-4 hates to be confronted with finally arose: whether to delay shipment of critically needed ammunition or not to feed the troops. The problem arose because a straight spell of seven days of bad weather precluded unloading of rations from Liberty ships lying off shore. The last American ration on the beachhead, which incidentally was a K ration, was issued the day the decision was made that rations would be hauled by LST-truck turnaround, therehy

sacrificing urgently required ammunition build-up. However, no soldier missed a meal because of lack of food, and no gun failed to hurl steel at the enemy because of lack of ammunition.

An idea as to the intensity of the enemy's air and artillery effort can readily be gleaned from the fact that from the time of the landings to the day that the main Fifth Army forces joined hands with the beachhead forces, ammunition losses in the army dumps alone averaged 62.9 tons daily. Hospitals had to be practically burrowed into the ground to prevent excessive loss of life. Supplies of all sorts, and specifically ammunition and gasoline, had to be bunkered. Additional difficulty to this bunkering problem was the fact that the water table in this area was just under the ground surface, thereby precluding digging anything too deeply. Bulldozer blades were mounted on tanks, which were utilized to combat fires in the ammunition and gasoline dumps. An L-shaped bunker was found to be the best solution to prevent the spread of ammunition and gasoline fires. Personnel fighting fires at the gasoline and ammunition dumps could either push the piled-up dirt of the "L" over the blazing ammunition or gasoline stored in the bunker by means of the tankdozer, or spread the blazing contents for quick consumption. A maximum of thirty tons of ammunition was allowed in one bunker, and bunkers were built thirty to forty yards apart.

The ingenuity and wholehearted cooperative efforts of all concerned helped solve the port problem. The estimated 400-ton port of Anzio grew into a major port despite enemy efforts to harass and hinder unloading, combined with the fickleness of the elements. An average of almost 4,000 tons per day was unloaded over the beaches and through this port, the maximum tonnage discharged being 7,800 tons on the best day. From one point of view, the enemy's efforts to prevent the use of the port did not hinder or hamper us but rather helped us. "Rubble-ized" buildings resulting from the destructive effect of enemy bombs and shells provided the engineers with a local source of materials to build necessary unloading hards and roads, and permitted them to widen the many narrow streets surrounding the immediate dock area.

Towards the end of the existence of the beachhead, the area was literally loaded down with supplies, since G-4 had decided to build up a thirty-day level of supplies for the entire Fifth Army, thus making Anzio an advance army dump literally behind the enemy's lines in order to support operations when the main forces on the Garigliano River front joined the beachhead force. Insufficiency of storage space finally became such that unloading operations had to be curtailed. It was physically impossible to crowd further troops or supplies into this "advance dump." This foresight in planning made possible the initial logistical support of the Fifth Army's sensational pursuit to the north of Rome following the Anzio breakout.

The failure to break the Cassino and Garigliano River front after the launching of the Anzio beachhead necessitated the regrouping and shifting of the entire army from the Cassino area to a narrow sector on the west coast. Anyone who has been through the experience of shifting a line of communications will know what an intricate, exacting, and patience-consuming job it is to sort out the major parts of two large field armies—combat troops, dumps, supply lines, supporting service troops, etc.—all done under great secrecy and while actively engaged with the enemy. Definite schedules were set up by G-4 for changes in dump levels to reduce, as far as possible, movement of dumps, and in closing and opening of new dumps. Deadline dates were set for the various phases of moving service units. When one considers that Americans, British, Canadians, French, Italians, and New Zealanders were involved in the shuffle, it is not difficult to visualize the mental maelstrom surrounding G-4. Dump sites were picked by the army services and corps staff under the direction of the army G-4. In addition to those which were immediately stocked, many sites then under small-arms fire were se-

lected by a study of large-scale maps and serial mosaics, and after scanning the ground through binoculars or in small groups so as not to tip off future plans. These dumps were actually stocked in the initial phases of the preparatory fire in order to get supplies across the Garigliano and in close support of the troops for the all-out attack.

The general practice adopted early by Fifth Army in selecting dump sites was to study all available information on a site previously selected from the map to support a contemplated operation and assign general areas for I, III, V, and for the II and IV installations. When the area was actually cleared of the enemy (and many were the times when this was in doubtful status), the army services met with the corps services and the army and corps G-4 representatives, and reconnoitered in the general areas assigned to each service to pick specific locations. The army engineer road and bridge expert and a Transportation Section traffic officer accompanied all dump reconnaissance groups. Subject to corps G-4 approval and to concurrence from the army engineer and transportation representatives, the sites are accepted by army G-4 and immediate stockage is initiated. Levels are set up by army G-4. Mine clearance and preparation of entrances and exits are tasks performed by corps engineers for installations in the corps zone and by army engineers for those in the army zone.

Between 1 February and 11 May 1944 all troops were shifted and all supply installations moved. At the same time, G-4 was giving top priority to all demands placed on him by his advance command post detachment at Anzio. To complicate matters further, War Department orders were received to reorganize the bulk of the units in the army under new Tables of Organization and Equipment. Because of the lack of equipment, adjustments and substitutions had to be figured out for all of the reorganized units in order not to lower their combat efficiency.

Nevertheless, early in May 1944, Fifth Army jumped off on the main front, crossed the Garigliano, and made its phenomenal breakthrough of the Gustav Line. Without pausing for breath, it broke through the Hitler Line and joined forces with the beachhead units, captured Rome, and chased the enemy north to the Arno River. The lines of communications stretched like a rubber band, and like all rubber bands when pulled to elastic limits, almost snapped.

The army supply was effected by the full utilization of truck transport. Up until this time the supply system had followed established procedures, i.e., army establishing Class I and III truckheads and ASP's in very close support (three to twenty miles) of the combat troops with Class II and IV army depots within thirty to fifty miles, truckheads and ASP's being leapfrogged as necessary, units "eating out" the old location prior to opening of the new one. This system, which is sound for slow, steady advances, was no match for the whirlwind campaign which developed. The army G-4 decided that an innovation was necessary and the risk worth the try. An army liaison officer from each Class I, III, and V supply dump was set up with the corps services. These officers obtained directly from the divisions what type and quantity of supplies they wanted delivered the next day, and at what place. This information was checked through corps and sent back to the army supply dump by messenger. The service concerned placed the required transportation order on the Transportation Section for the immediate dispatch of the requested supplies to the stated place of delivery. Small detachments of the army supply service concerned manned these one-day truckheads and ASP's and moved along as location changes occurred. The time element from the time request was received at corps to deliver at these "one-night stands" and the actual delivery of the supplies at these points was thirty-six hours. This system proved sound, as it resulted in the supply of the rapidly moving forces.

Up to the time of joining of forces at Anzio, these semi-mobile truckheads and ASP's met the crisis. However, the end of the rope

was being reached when the beachhead and main front forces joined, as the line of communication stretched overland from Naples to Anzio. Foresight in planning and utilization of every square foot of dry ground on the beachhead for the storing of supplies to meet this contingency saved the day. Both the Anzio force and main Fifth Army forces could now be supplied for almost thirty days from the stocks laid down on the beachhead.

With the fall of Rome on 4 June, the unrelenting pursuit ordered by General Clark again created a problem of supply to keep the combat elements fed, rolling, and supplied with ammunition. A supply axiom was forcibly brought to mind at this time, in that in a pursuit, ammunition requirements become negligible and gasoline supply becomes a paramount importance.

Based on the experience gained in port operation at Anzio, and due to the fact that the base section was fully occupied at Naples in continuing to unload supplies shipped from the States and trying to push those supplies forward by ship, truck, and rail, army G-4 decided to utilize any and every port available along the western coast of Italy to supply Fifth Army. The first port of any consequence north of Anzio was Civitavecchia. The engineer regiment, which operated Anzio along with the naval control party, and necessary service dump personnel, moved into this port on the date of its capture, 13 June. All personnel and units engaged in the port rehabilitation and operation were placed under operational control of army G-4. Members of the G-4 section moved in to effect this control.

The engineers tackled this completely destroyed and hopeless-looking port with bulldozers and dynamite, and four days later, on 17 June, the first LCT's began to unload supplies over temporarily built hards. On 18 June the first Liberty ship began to discharge its cargo into unloading craft. Further engineering efforts finally developed two alongside berths and unloading anchorages for at least thirteen Liberty ships. G-4 allocated all dump areas and established traffic control so that the least delay possible would occur in the movement of supplies from ship to dump and from dumps to truckheads and ASP's.

It was in the rail yards of Civitavecchia that the famous "Anzio Express," the German 280-mm railroad gun, was trapped by Air Corps bombings of the rail lines. In fact, three such guns were seized. Most of the personnel involved in opening the port of Civitavecchia had been on the receiving end of the shells thrown out from these guns, and to say that it was a heart-warming sight to see the monsters in our hands would be belittling the avid curiosity which was displayed by all concerned. G-4 again demonstrated, in opening and operating this port, that although G-4 is only supposed to establish policies and supervise their execution as laid down in all staff procedure teachings, members of his section may be called upon actively to coordinate and control ports on an operational basis rather than a policy scale.

Despite the speed with which supplies were laid down at Civitavecchia, combat elements in hot pursuit of the retreating Germans were again fast outrunning their supply lines, particularly as it pertained to gasoline. Army G-4, in planning the continued support of the fast-moving troops, had the choice of opening up and developing the port of San Stefano which was fifty-four miles north of Civitavecchia, or considering the possibility of a complete rout of the enemy to the Arno River and utilization of the Port of Piombino which was some 117 miles north of Civitavecchia. Decision was not delayed long. Reconnaissance parties of the engineer pipeline construction company, which had been alerted to the possibility of gasoline storage facilities at San Stefano, moved into San Stefano on the date of its capture and discovered adequate storage facilities still intact. The help given to these reconnaissance parties by Italian patriots was invaluable to the continued movement of the army. Several Italian patriots, former employees in the gasoline storage plant, had prevented sabotage of the facilities by the Germans, some of them losing their lives in the effort. One of

these Italian patriots was found in a diving suit looking for underwater mines in order that he could report their location and thereby expedite tanker berthing. This eliminated dependence on a pipeline from Rome north, which was at that time being contemplated for construction and which would have been months in effecting. Decision was reached by G-4 not to develop San Stefano as a port for discharge of all classes of supply but to utilize it solely for the discharge of gasoline. Piombino was decided upon as the next port for development by Fifth Army to meet its general supply needs.

It is desired to stress the speed with which supply activities had to be effected. On 13 June the development of Civitavecchia started, and four days later the discharge of supplies began. On 26 June two engineer regiments and a naval control party, army service units, and G-4 members moved from Civitavecchia to the Piombino port area to start its development as a supply port for Fifth Army. On 6 July, Fifty Army relinquished control of Civitavecchia to Peninsular Base Section.

The city of Piombino was captured not by the doughboys but by two battalions of the port development engineer regiments which had started out to get there as soon as it fell into our hands, and who got tired of waiting, knowing the tremendous job in store for them. The enemy had not been completely cleared in the northern outskirts of the city when the engineer bulldozers began clearing one of the most thoroughly devastated ports in Italy. The havoc wreaked by our bombers coupled with the demolitions performed by the enemy again presented a seemingly hopeless task.

Port clearance and construction of hards started during the night of 25-26 June. The first LCT's, with approximately 1,000 tons of supplies, arrived and were discharged four days later, or on 30 June. Only one alongside berth was capable of development and all discharge of Liberty ships had to be effected by the use of Dukws and LCT's. The average tonnage discharged increased daily up until 15 July. From 16 July to 29 July Fifth Army lost all LCT's and at the same time had to outload 17,000 French troops and their equipment in preparation for the invasion of southern France. Because of the lack of craft, the Navy personnel, which was teamed with the engineers for development of the port, salvaged approximately seventeen large wooden barges in the surrounding water where they had been sunk by the enemy. These acted as a stopgap until "Zed" craft replacement program was completed and fresh unloading crews were at Piombino. Thereafter, daily tonnage discharge increased materially, and on 6 August a peak in tonnage unloaded of 7,936 long tons was reached. On 7 August, army units were withdrawn from port and dump operation and the Peninsular Base Section assumed control thereof. During the period 26 June to 8 August, or the period during which Fifth Army was responsible for operating this port, the daily average tonnage discharge was 5,169 long tons. This gave the army about a 1,500-ton daily build-up.

It might be well to point out functions that a G-4 has to assume in operating ports. Although port commanders are named, G-4 actually functions as "king of the port area," because he has the authority to make decisions on the spot for the Commanding General. Multitudinous problems arise daily and decisions must be rendered immediately in order to forestall any delay in the port and supply operations. The Navy, Merchant Marine, stevedore crews, army services, AMG, all have their "finger in the pie." As a consequence, conflicts arise which invariably end up in the lap of G-4. It is necessary that such ports be run with an iron hand and nothing allowed to stand in the way of speedy ship discharge. Civilians must be banned from the port area, severe traffic and curfew regulations must be established and enforced, and dump operations must not be allowed to interfere with the rapid discharge and movement of cargo from ships. An engineer real estate office must be installed as part of the G-4 office to handle all requisitions for billets, material, or property. It was found that after a port was well estab-

lished and dumps well stocked, it could gradually be turned over to the base section to operate, their personnel replacing the army setup.

While Fifth Army continued to unload and stock supplies at Piombino, combat units reached the Arno River line after capturing Leghorn. When the port of Leghorn was taken and while it was still being subjected to artillery fire, an area encompassing the city proper was set aside under army control. Base section and naval personnel, including heavy port reconstruction units, were moved into the city for port development work. This port was to be developed to the fullest in order to eliminate Naples as the army's main port of supply. The tactical situation had changed and time was available for port development by the base section in the perscribed manner, since Piombino was able to support the army. An army detachment consisting of a G-4 representative and an engineer real estate officer was put in complete charge of the city with the dual role of preventing interference with tactical operations and movements and of assuring the maximum freedom to the base and Navy personnel working on the port reconstruction project.

After a period of troop and supply build-up, Fifth Army opened its offensive against the vaunted Gother Line high in the Apennines. To support this operation, G-4 established army depots in the Florence area. Truckheads and ASP's were established as far forward as the tactical situation would permit in order to eliminate unit supply traffic on the only available road.

To summarize, Fifth Army G-4 has solved the numerous supply problems presented by General Mark W. Clark's tactical decisions. What it takes to be a good G-4 can best be expressed by a quotation from Rudyard Kipling:

> I had six honest serving men—
> They taught me all I knew—
> Their names were Where, What, and When,
> And Why, and How, and Who.

Problem of Morale

From an article by Major General G. B. Chisholm, Director General of Medical Services, Canadian Army, in *The Military Surgeon* February 1945.

Good morale results from satisfying certain specific needs, or enough of them to a sufficient degree. Among these needs the most important probably is that of a goal, a national goal, an organizational and an individual goal—goals which provide reasons for striving and incentives for self sacrifice and devotion. These goals can be set up only by planning at various social levels. Other necessities are:

Consistent policy, and confidence in the integrity, sincerity, and ability of leaders.

Confidence in the goodwill and devotion to a common cause of the organizational group. Grouping with unwilling or half-hearted allies is a heavy handicap to morale.

Confidence in services such as medical and their ability to cope with all wounds and diseases.

Confidence in fair systems of promotion and preference, with no favoritism on any grounds, and with this a reasonable confidence that merit will be recognized and encouraged by expanding responsibilities.

Confidence in one's own importance to the group based on adequate training and ability.

Confidence in adequate supply and quality of material.

A reasonably satisfactory philosophy of life—whether religious or other—which allows sufficient satisfaction, for the particular individual, of instinctual needs, without guilt, and is sufficiently socially acceptable to avoid trouble with the group sanctions.

A sufficient degree of satisfaction of these necessities will produce good morale through the production of a feeling of security.

Combat Engineers in Beach Operation

LIEUTENANT COLONEL MARVIN C. ELLISON, *Corps of Engineers*
Instructor, Command and General Staff School

A rugged, uninviting coastline with heavily defended harbors and fortified positions constituted virtually an impregnable defense against an invader until amphibious technique of World War II made its appearance. The Japanese first demonstrated the potency of water envelopment of harbor defenses in spreading like a cloud of locusts across the China Sea to engulf Singapore and the Philippines. They effectively demonstrated that the heaviest of coastal batteries, emplaced to fire out to sea, were ineffectual against foot troops infiltrating inland from unorthodox landing points. The Japs used a hodgepodge collection of light boats, including fishing craft, sampans, and wooden barges, to land on a broad front and push inland. This insidious method of expanding Japanese influence over Greater East Asia carried the armies of the Rising Sun almost to the shores of Australia before Allied action at Guadalcanal and Milne Bay blocked their progress.

In the dark days of 1942 the Corps of Engineers conceived an organization which has done much to pioneer the landing of troops on hostile shores. This organization was designated as the Engineer Special Brigade, designed to transport men and supplies from a friendly shore to an enemy shore and support the landing with a constant flow of reinforcements and supplies until port facilities were secured or developed. This type of operation was planned for island hopping over water distances of approximately one hundred miles. The transport of troops and supplies for landing operations in excess of one hundred miles was still considered as primarily a Navy job. Ingenious industrialists quickly fell into line and designed landing craft to keep pace with expanding Allied amphibious plans. Training centers were established to train specialists in operation and maintenance of small boats and to train troops in landing technique. The Army worked to master the shore-to-shore operation while the Navy, Marines, and assigned Army units worked to master the ship-to-shore landings. The efforts of the Army and Navy of the United States and its Allies brought forth many new developments in landing craft and a realization of the need for combined training of all arms in landing operations. Just as bayonet training is perfected with endless dummy runs, so is it necessary to perfect the techniques of landing operations by many dry runs and full-dress rehearsals.

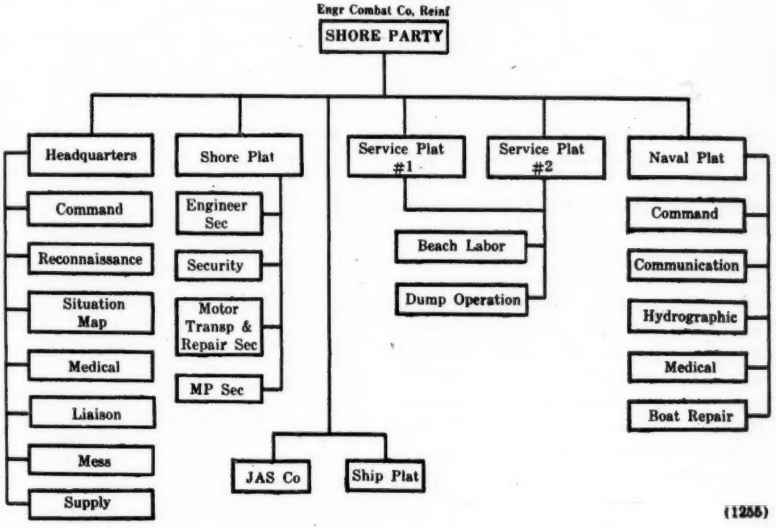
The Allied amphibious threat, backed by air and naval power, has the enemy reeling from thrusts which he is unable to counter. Landings on the shores of North Africa, Guadalcanal, and Attu served to demonstrate the soundness of training doctrine and the need for continued training and development in equipment and organization. Landings in Italy illustrated the necessity for an Allied air umbrella over the beachhead. Landings on Pacific atolls, Tarawa, Kwajalein, and other islands of the Marshall and Caroline groups added to our technique of overcoming the toughest of natural or man-made obstacles. All these landings served as a prelude to the "main show," the much-talked-about second front. The trial landing at Dieppe was a bloody example of enemy action that would greet the Allies on the shores of France. The Allies saw that the invasion could only succeed by the establishment of powerful beachheads capable of serving as ports for days or even months after D-day. British and American engineers went into a huddle, and after many days of arduous planning came out with a fantastic design for a prefabricated port. Two prefabricated ports, one British (Army and Navy) and one U.S. Navy, were constructed in English ports and towed across the Channel following close behind the assault forces. On D plus 13 a disastrous gale played havoc with the American port and badly damaged the British port, but even in their damaged state the ports served to supply the invasion forces until Cherbourg was captured. By mid-July the British prefabricated port was

operating in a capacity far above that of many of the world's best known ports.

Island-hopping tactics, bypassing and neutralizing such Japanese strongholds as Rabaul and Truk, have moved the Pacific battlefront thousands of miles west. Landings now point to Formosa, the coast of China, or even to "home base"—the islands of Japan.

Ship-to-shore landings and shore-to-shore operations by U.S. Marines and Army troops in the South and Central Pacific areas have emphasized the importance of a well-trained, highly-organized shore party. In the early landings, combat troops of the invading force were used in back-breaking work on the beaches. This lowered the combat efficiency of fighting troops and jeopardized the success of the invasion. Continued operations brought about the development of a standardized organization for the shore party. In order to function properly the shore party must be a part of the landing force but must be made up of service troops attached for the specific mission of organization and operation of the beach area. The shore party must contain sufficient personnel and equipment to sustain adequately the invading force in reinforcements and supplies until port facilities are developed. Where operations do not permit use of the Engineer Special Brigade shore-to-shore organization, a special shore party group may be formed under an Engineer Combat Group Headquarters. A division task force would normally be supported by one engineer combat group.

BATTALION LANDING TEAM
SHORE PARTY



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Shore Party Operation

An engineer combat group supporting a division task force normally contains three engineer combat battalions, reinforced with medical, ordnance, quartermaster, military police, signal, Transportation Corps, and engineer specialists.

The commander of the engineer combat group functions as a staff officer on the staff of the commanding general of the task force to which the group is attached. He is the shore party commander for the task force. The three combat teams, normally formed

within an infantry division, are each supported by one engineer combat battalion, reinforced. The combat teams are further divided into battalion landing teams and each landing team is supported by an engineer combat company, reinforced. A naval beach platoon is attached to the engineer combat company to handle the naval functions of the shore party supporting a battalion landing team (see chart).

The shore party of a battalion landing team is the basic organization for shore party operation and contains all of the elements necessary to perform its mission. The reinforced engineer combat company, supporting each infantry battalion in a landing operation, will contain approximately fifteen officers and 495 enlisted men. The total personnel composing an engineer combat group, serving as the shore party for an infantry division, reinforced, will normally run fifteen to twenty percent of the entire landing force. The commander of the engineer combat company is the shore party commander of the battalion landing team and is responsible for the operation of the naval platoon and all other attachments to the company. The duties of the shore party are numerous but can usually be clearly defined in a standing operating procedure. The principal duties of the shore party are as follows:

ARMY

1. Mark beach limits, select sites for dumps, roadways, and landing points.
2. Maintain situation map and liaison.
3. Communication, including Joint Assault Signal Company functions of ship-to-shore and lateral nets.
4. Beachhead security.
5. Unload supplies and equipment from landing craft and establish dumps.
6. Maintain situation map, records of supplies and personnel landed.
7. Issue supplies to units.
8. Motor and heavy equipment repair and and de-waterproofing.
9. Removal of beach obstacles.
10. Traffic control.
11. Aid and evacuation stations.
12. Protection of supplies from fire and pilferage.
13. Messing and quartering of beach personnel.

NAVY

1. Ship-to-shore visual communication.
2. Locate and mark channels and navigational obstacles.
3. Keep beach clear of boats.
4. Furnish relief boat crews.
5. Evacuation of wounded.
6. Repair of boats and motors.

All operations on the landing beach, both Army and Navy, must be under the direct control of the shore party commander. The duties of the Army and Navy components of the shore party are clearly defined but in actual operations are likely to be interchanged. The naval officer in command of the beach platoon is the Beach Master and assistant to the shore party commander, serving as his adviser on naval matters. Prior to any landing on enemy shores, the shore party and the naval platoon should train and operate together until a knowledge of the problems of each is mutually understood and appreciated. Emergencies will arise in actual operations that will require the full cooperation and effort of all beach personnel. The Army personnel must be ready and willing to assist the Navy in retracting boats, removal of beach obstacles, and in the performance of other naval duties, while the naval personnel must be available for emergency employment on tasks normally performed by the Army.

The employment of engineer combat battalions on shore party work is foreign to the mission for which the unit is organized and equipped. Therefore, when it is planned to use such a unit on shore party work, sufficient time must be provided for concentrated training in shore party functions. Operations in the various theaters have shown that engineer combat battalions properly trained

and reinforced with other service personnel can well fit into the picture as the nucleus of a shore party. The engineer combat group should be reinforced with such special engineer units as the engineer light equipment company and the engineer maintenance company. Even these units will not completely solve the problem of heavy equipment and equipment operators. Additional equipment beyond the normal issue will have to be obtained and operators must be trained in sufficient numbers to operate the heavy equipment on a twenty-four hour basis. Maintenance of the heavy equipment, subjected to continuous operation and exposed to the corrosive action of sea water, becomes a major problem of the shore party. Provision must be made for a supply of spare parts to replace breaks that will occur under heavy usage. Each engineer company, reinforced, serving as a shore party for a battalion landing team will normally have its table of equipment increased to include the following special items of equipment:

Crane, 10-ton	2
Crane, 20-ton	1
Generator set, ½ KW w/floodlights	3
Lubricator, trailer mtd	1
Shovel, crawler mtd	2
Tractor Caterpillar D-4	3
" " D-6	3
" " D-7	8
Trailer, flat bed, 20-ton	2
Winch, 5-ton	2
Winch, 10-ton	2

At least one-half of the tractors should be equipped with A-frames for handling packages on the beach. The maximum use of mechanical means for movement of supplies should be employed. Roller conveyors may be installed to move supplies over the beach or in consolidating supply dumps. The Corps of Engineers has recently developed an all-purpose tractor for employment on beach operation. This machine is known as the beach tractor and is equipped with an A-frame crane and an armored cab. The dozer blade is designed to conform to the width of the tractor itself, so that the piece of equipment may be loaded or unloaded from landing craft without removal of the blade.

Beach Supply Dumps

Intelligence reports and a study of maps and photos will enable the shore party commander to place supply dumps to the best advantage. Care must be taken in initial planning to provide for the consolidation of supply dumps into task force or division installations. A system must be devised for recording supplies arriving from ships and being issued to troops. The level of supplies in the beach dumps and aboard ship should be readily available to the shore party commander at all times. A good road net will provide for at least two roadways in each battalion landing team area leading from the beach to dumps and a circulating roadway returning to the beach. As soon as possible, a two-way lateral roadway should be constructed to provide for lateral movement of supplies that may be unloaded at the wrong beach. The tendency for all personnel to become pilferers while unloading supplies should be prevented. The removal of property accountability and the desire to satisfy hunger or thirst will cause personnel to break open packages indiscriminately. Looting by civilian personnel often becomes a problem, and firm measures must be taken to guard against loss of supplies by pilferage or looting. Supply dumps should be organized so as to obtain maximum dispersal of ammunition and gasoline. Location of dumps under cover and improvement of camouflage conditions should be a continuing process.

Palletization

A standardized wooden pallet, six feet by four feet, has been used in a number of operations in transporting supplies from ship to shore. Palletization of supplies is accomplished in the staging area, using steel ties to bind the package. Waterproof paper may also be used to prevent packages from being exposed to sea water. The extent to which supplies are palletized will largely depend upon the type landing to be made. When beaches appear to

offer a reasonable approach to shore, palletization is highly desirable. If, however, it is known that the landing will have to be made over a coral reef with a considerable body of shallow water separating the reef from the beach, palletization should be kept to the minimum. For the normal operation in the Pacific, a task force should palletize fifty to sixty percent of its supplies and equipment. When supplies are palletized, care should be taken to provide plenty of cutting tools for breaking the ties either on the ship, on landing craft, or on the beach.

General

The shore party commander is responsible for proper organization of the shore party in the event of an enemy attack. Where enemy air attacks are expected, personnel will be required to dig foxholes and remain in foxholes except while on duty on the beaches. A liberal usage of antipersonnel and antitank mines will aid materially in keeping infiltrating enemy troops outside the beach area.

Shore party personnel must have their clothes distinctively marked so they can be readily identified.

A standardized set of beach markers for day and night operation must be provided and equipment should be landed to prepare such additional markers as are needed.

Summary

An engineer combat group may be successfully employed as a shore party for an amphibious operation if sufficient time is allowed for specialized training, and if the group is adequately reinforced with service personnel and special equipment. All shore party operation must be closely supervised and control must be centered in the shore party commander. Keeping of records and situation map to show the status of supplies and location of units is of paramount importance. The percentage of palletization should be decided upon after a careful study of intelligence data covering enemy beaches and should be coordinated with the naval transport service.

Target Priority

From a British source, 5 April 1945.

American troops entering Krefeld-Uerdingen are reported to have been surprised and chagrined to find some German factories in the area practically untouched by Allied air bombing.

It is a misconception that, vast as the Allied air blitz has been, it has been complete. If it had been, the war would probably have been over. The fact is that at no time has the RAF or the U.S. AAF had enough planes to make their destruction of Germany total.

They have had to select the most vital targets and give them priority, leaving the less vital ones for future raids. The priorities are agreed upon jointly by British and American experts. And even those that have been smashed have, in many cases, been restored with considerable ingenuity by the Germans. A good deal of the work of the Allied airmen has been rather like mowing the lawn.

What is of chief interest about this report is that it shows that the Germans, as was expected, are being clever and have wasted no time in using the undamaged state of some factories as a means of sowing discord between Britain and America. Already the explanation has been spread about that the company owning one of the plants has six English directors on the Board. It is probable that when British troops come across similar conditions they will learn that American directors are on the Board. The planting of rumors of this kind has been anticipated, but this is the first actual published example.

A Tactical Air Force Assignment

WING COMMANDER R. H. HARRIES, *Royal Air Force*

I.

THE organization of the air forces which are providing tactical support for our armies in the field was dictated by two overriding considerations: first, the tasks which these air forces would be called upon to perform; and second, the supply, maintenance, and employment of the types of aircraft best suited to perform these tasks.

The first of these considerations always depended on the second; it is of no use to prepare a military unit of any kind to undertake tasks for which it has not got efficient weapons, but in the air war the development of weapons has been breathtakingly rapid and the unexplored possibilities of these new weapons have often left the planning of their operational role far behind. The advent of a new aircraft always presents the same series of problems. For example, the machine may have originally been designed as an intercepter fighter, like the Typhoon. The fighter-bomber experts may see in it just the virtues they are seeking to improve their technique. Bomb racks are therefore fitted, and, after a series of experiments during which the engine may be de-rated, the armament altered, the armor plate regrouped, and the wing redesigned, the experts declare that they now have the close-support weapon they want. Now, before quantity production is put in hand, rocket projectiles are emerging from the experimentation stage, their use may show big advantages over the use of bombs, a new tactical field for experiment is opened up, and the cycle starts again.

This sort of evolution has been going on at breakneck pace throughout the war, but time came, however, when a halt had to be called, and then the two considerations listed above had to be taken in their proper order. That is to say, when the planner, in the light of the known capabilities of aircraft already on the production lines, could lay down the tasks which these aircraft could undertake in the support of the army, the army could then plan their operations with a known coefficient of support.

Let us examine very briefly the basic principles which were decided upon:

The tasks the Tactical Air Force are called upon to perform in support of armies are:

1. To achieve and to preserve the measure of air superiority which will give the armies unrestricted freedom of movement.

2. To support the armies in their deliberate operations and to play its part in the prearranged battle plan.

3. To provide moment-to-moment support and to attack targets of opportunity in the actual progress of the battle.

To implement this program, the following types of aircraft were chosen:

I. Pursuit aircraft, whose major task was to achieve air superiority. These were adapted to carry bombs also, and their engines were suitably rated, at one stage, for low flying.

II. Ground attack aircraft, whose major task was to carry bombs, rocket projectiles, and a heavy weight of automatic weapon fire.

III. Reconnaissance aircraft, with adequate camera equipment and with the speed and/or the armament needed for their own protection.

IV. Medium bombers for interdiction and "softening" purposes.

V. Night fighters.

Types I, II, and III are all single-motor aircraft; they can be serviced by comparatively small and mobile units and they can be flown off stripways. Their range is limited and they must be deployed as closely as possible behind the battle area. In view of these facts, units comprised of classes I, II, and III were grouped into the units which are very closely affiliated with the Army Commands in the manner which will be discussed later.

Type IV require larger servicing echelons, being two-motor aircraft, and except in the best weather conditions they must have runways to fly off. On the other hand, their greater range makes it possible to work from more distant bases. Provided their operational control is kept flexible, they can,

within the time limits imposed by the armies, operate on a very wide front, a front wider than any one army can cover. Their correct affiliation, therefore, is at the level of an army group.

Type V require even more complicated servicing arrangements; the large attendant gaggle of radar ground and air equipment being one reason, and the need for night flying control installations being another.

II.

(In the course of this article, when it will be necessary to refer to units, the Royal Air Force designation will be used, and in brackets, the U. S. Army designation will be added once for clarity.)

At the level of Army-Group, and at the same headquarters, is a Tactical Air Force Command. This Command has control of the Groups [Divisions] of single-engine aircraft which are directly affiliated with the armies within the Army-Group, and it has control also of the Medium Bomber Group, which can be switched at will to any army front. Further, it controls the Base Group which operates the night fighters; and finally, it maintains the closest contact with the Strategic Bomber Force based in England. It is obviously outside the scope of this article to deal with the whole picture. It is proposed to deal with the control of operations only, operations at the level of a Group.

The Group Headquarters.—This is split into three parts. The first, or main, section shares a headquarters with the army to which it is affiliated. Command, staff, operations, and intelligence are located here. The second, or rear, section concerns itself with administration, supply, and personnel, and it is located within convenient reach of all its subunits. The third section is the Control Center. Whereas the Tactical Group Headquarters working alongside Army Headquarters is responsible for the direction of the battle, Control Center is a clearing house in which the directives from Group are broken down, in which tasks are allotted, and in which a general tag is kept on the commitment position. The Control Center is also the center of the Groups Communications, and the telephone, teletype, R/T, W/T [wireless telegraphy], and courier channel have vertical and horizontal links between it and all the formations within the Group. It is, therefore, through this channel that all information back from the airfields is canalized and sifted before it reaches Group. This last is by no means the least important function of Control Center, for every close-support mission is a potential reconnaissance as well.

The Wing Headquarters.—Below Group, the next authority is the Wing. This controls anything from three to five squadrons. It maintains its own aircraft and defenses; it is highly mobile, being ready to move, lock, stock, and barrel, at six hours notice; the commanding officer is a Group Captain [Colonel], who has sufficient authority, should all communications break down, to continue the battle on his own initiative.

The implementation of the operational orders received from Control Center is delegated to a Wing Commander [Lieutenant Colonel], known as Wing Commander Operations, who is responsible for seeing the orders carried out, for leading the Wing in the air, and for matters concerned with tactics, air discipline, and so on. He has a staff of operations, intelligence, and Army Liaison Officers, and is responsible to the Group Captain for the running of the section.

Thus far, the organization can deal with the prearranged support the details of which are received on the orthodox channels. Provisions must be made for snags, sudden changes of plan, and for attacks of fleeting or opportunity targets. Group/Army, Control Centers, and Wings are linked up to the Army W/T network. Requests for aid and nomination of the targets are picked up on this channel by all simultaneously. While Group/Army Headquarters are considering each message, the Wings have the opportunity to pinpoint the target. No action is taken, however, until the target has been approved by Group/Army Headquarters and allotted to a Wing by Control Center. The

target may prove to be too fleeting, it may be better dealt with by artillery or by medium bombers, or it may not be worth while at all.

At all levels the Air Liaison Officers [GL Officers] watch that the army situation is fully appreciated.

With this brief background picture, let us consider a typical assignment.

III.

Enemy ground troops are holding up the advance of our army. They are well dug in, making use of trenches, concrete strongpoints, and buildings.

A call for air support is initiated by the army, at, say, brigade level, over its W/T network; this, as we have seen, is received simultaneously by Group/Army Headquarters, by Control Center, and by Wing. The target is approved for air attack, and Control Center decides that it can be suitably dealt with by pursuit aircraft, bombing, and strafing; in the light of their availability table, they nominate a Wing to undertake the task.

This nomination takes the form of an order to the Wing concerned, detailing the strength required, the general lines of the attack, and the time over target; the choice of tactics is left to the Wing Commander Operations at the Wing Headquarters.

At Wing, the duty Operations Officer receives the order and passes it immediately to the squadrons who will take part, to Intelligence, and to the AL section. The squadrons, who are already in a state of preparedness, i.e., at sixty, thirty, or fifteen minutes availability, or at immediate readiness, are called to the operations room for briefing.

It will be advisable, here, to digress and to examine the briefing preparations in detail. It must be remembered that the AL Officer has already picked up the initial request for support from brigade on his W/T tentacle. All such requests are not granted, but each request, which is prefaced by a reference number, is pinpointed on a "Target Map" where it remains until either it is cancelled or the task is completed. The order from Control Center is prefaced by the same reference number, the AL Officer can therefore immediately locate the target and can begin to prepare maps and photographs, while the Intelligence Officer busies himself with routing the aircraft to avoid flak, with working out their courses, and timing the attack precisely. It is essential that every pilot shall know the bomb line; he must also know the position of our forward troops in case he should have to make a crash landing; on top of this, each pilot must be fully conversant with every detail of the military situation; as stated already, every flight is a potential reconnaissance, and without a full knowledge of the position, intelligent reconnaissance is impossible.

The next point to be prepared concerns the tactics to be employed during the attack. The considerations governing the choice of tactics may be conveniently catalogued:

1. Bomb Effect.—Under this heading we must consider two things: first, the length of delay chosen for the fuzes; and second, the type of attack. Three examples will serve to illustrate the problems which confront the Wing Commander Operations in making his choice.

a. Enemy troops taking shelter in a wood are best attacked by bombs which explode at the head height. Instantaneous fuzes might cause bursts high up in the branches, but a delay of .025 seconds will cause a bomb which hits tree wood to explode just above ground level. This type of attack must be made from altitude to get a vertical strike, so dive bombing is indicated.

b. Railway interdiction is the task. In Holland, railways are embanked; therefore, a shallow "skip" attack is indicated because the skipping bombs will be stopped and will lodge in the bank. In this case, to enable the bomb to penetrate the bank to achieve the greatest damage, a longer delay fuze is chosen. In low-level attack the fuze delay is also necessary to allow a section of aircraft to attack and pull clear before the debris starts flying. Delays of up to fourteen seconds are usual in this case. To at-

tack a yard or a switching area, skip bombing is of restricted value. To begin with a straight and low run is rarely possible, since such targets are usually associated with an urban area. Again, on a large level area the bomb will skitter and may end up several hundred yards from the aiming point before it explodes. A dive attack with instantaneous fuzes will be better, a few long-delay bombs added to hinder repair work.

c. Entrenched positions in the open are to be bombed, and this is to be followed by a strafing attack, the attack to be carried out by a squadron at a time. The best concentration when a squadron is involved is achieved by dive bombing, and often a couple of delay bombs are included to keep the enemy guessing while the squadron is forming up for its cannon attack. Explosions, say fourteen seconds after the last bomb has fallen, while too soon to endanger the strafing aircraft, may well prevent the enemy pulling himself together in the interval.

2. Weather.—Dive bombing requires a ceiling of at least eight to ten thousand feet. If weather conditions do not provide this ceiling, then skip bombing with delay fuzes from low level must be substituted, though often this form of attack is not that dictated by the other considerations.

3. Anti-Flak.—Where positions are warmly defended, two alternative forms of antiflak tactics can be used. The first of these is where the squadron comes in low, in pairs, and from all directions to confuse the gun layers. The second is more complicated. Our problem in close-support work is concerned with light (as opposed to heavy) antiaircraft fire, that is, fire up to 40-mm caliber, firing at sight with tracer ammunition. When a position defended by light antiaircraft is under attack, coordination of fire is virtually impossible; each gun is blazing away independently. If the formation of aircraft is kept orbitting just outside the range of the weapons, the gunners will continue to shoot; their task becomes geometrically harder as the range shortens and they will shoot hard to keep off the attack. An experienced leader notices the rise and fall, the surge in intensity of the fire. No gun can fire without stopping; reloading, stoppages, and heat of barrel all contribute to the fluctuation. The leader chooses a moment of lull and takes his formation in. This technique has been used with success in shipping attacks.

Other tactical points to be studied before briefing are "get-away," or the drill to be followed after the attack, and the need for a fighter cover during the attack. These are dictated in the light of known antiaircraft positions near the target and known dispositions of enemy fighters in the area.

These problems are best considered in discussion between the Wing Commander Operations and the leader of the formation or formations taking part.

In the specimen operation we are considering, it has been decided that the whole Wing, perhaps four squadrons, will attack the strong-point. The target will be dive-bombed and will be attacked afterwards with cannon and machine guns. Bombs will be fitted with .025-second fuzes and the last section in will carry eleven-second delays. Briefing completed, the squadrons are timed to arrive at the target at ten-minute intervals to avoid congestion and to allow time for two strafing attacks by each. The army is informed of our timing, and the artillery have acceded to our request to lay smoke markers at the exact moment. This is felt to be necessary as an extra accuracy precaution, since the target is very near to the line of our forward troops.

During the attack itself, the Wing Commander may fly over the target in R/T contact with the squadrons, acting as a master of ceremonies to coordinate the whole mission.

Bombing done, the squadrons come in again with all guns firing from an altitude of about 500 feet. This last has proved an effective treatment against entrenched troops, giving, as it does, a depression angle of fire which can be achieved by no other automatic weapon. In addition, interrogation of prisoners has shown that it has a shattering effect upon morale; a bomb always

seems an impersonal missile, but a strafing fighter aircraft seems to be aiming at you personally.

Thus, in very impersonal terms, turn the wheels of our air forces in the field. There is much that is for other writers and other mediums of expression to portray—the excitements and disappointments, the tensities and the moments of relaxation, and above all, the real pride in a job of work which is going well. It is a privilege to be even the smallest cog in this machine, with the knowledge that behind it all lies a vast and intricate organization driven by the labor of millions and directed by the world's keenest brains. American and British airmen share the experience and the privilege, and together are proud to be the spearhead of the most efficient engine of war that history has ever seen.

Air Staff Training in Great Britain

Digested at the Command and General Staff School from an article in *The Aeroplane* (Great Britain) 2 February 1945.

THE influence on the Royal Air Force of the Staff College established at Andover in 1922 has contributed largely to the superiority of the Royal Air Force over the Luftwaffe. From a small beginning the college grew until, at the outbreak of war, the annual course numbered sixty-five students. Five hundred Air Force officers have graduated and are distributed throughout the Service. Nearly all officers holding important appointments have passed through the Staff College.

The first course under wartime conditions assembled in November 1939, but the college had to be closed down again in the following spring, when the invasion of the British Isles appeared imminent. Another start was not possible until the end of 1941, and then a new home had to be found, for the Andover buildings had been damaged by enemy action. From then onwards a sequence of courses of twelve weeks' duration has been held. The present course consists of about sixty students from all branches of the RAF and Dominion Air Forces, with four Army officers and one officer from the United States Air Forces.

Critics of the Staff College-trained officer have always existed and, probably, always will exist, but those who have experienced the difference between good and bad staff work will appreciate the value of staff training. Bad staff work, if luckily causing no more serious trouble, can result in considerable inconvenience to personnel of individual units. So the primary aim of wartime courses has been to teach staff duties and to help students to think clearly and express themselves explicitly by mouth and pen. That is the primary aim, but time is found during the twelve weeks to provide instruction on a number of other subjects. Not the least valuable of these is the coordination of the political, industrial, and economic resources of the United Nations with their sea, land, and air power. In spite of other war demands on their time, a number of prominent men in all walks of life addressed each course.

Apart from the value to students of the instruction they receive, the wartime Staff College fulfils another valuable function. Owing to its vast expansion and to the exigencies of war, a tendency has existed for the Service to split up into "private air forces." Little interposting between Commands goes on, and if an officer starts his service in Fighter Command he usually stays with it, and has only a limited knowledge of how other Commands are organized or operated. Staff College training gives officers wide and sound knowledge of all sections of their Service. Any posting from one Command to another would not leave a Staff College-trained officer out of place.

War Dogs on Morotai Island

KARL RANNELLS
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ONE of the newer organizational units to result from changes in modern warfare is the war dog platoon. As set up in its T/O, a dog platoon normally calls for twenty-one men, including one officer and a veterinarian, and twenty-seven dogs of both the scout and messenger types. This does not, however, preclude the revamping of a platoon to meet the tactical needs of the field unit to which it is attached.

Inaugurated by the Quartermaster Corps in 1942, the Army was slow to accept the K-9 Corps for tactical purposes. Considerable skepticism greeted its organization, especially from veteran jungle fighters who had learned the hard way that all too often their very lives hinged not only upon the method of advance but upon the amount of silence maintained. Experimental units were tried out with varying success.

When it was recognized that the war dog was not a cure-all or magic weapon but a special force for specific purposes, dog units met with increasing success with proper handling. And on the basis of field reports in general from the various theaters, there appears to be little doubt that the new unit has been accepted as a permanent part of the Army.

For instance, operations of the dog units assigned to it have been so successful that the Sixth Army is bending its efforts to have war dog platoons assigned to all of its infantry regiments. Reporting on the dogs assigned to his regiment, one commanding officer of an infantry regiment said:

"Our men going on patrol want dogs. They have great confidence in the ability of the dogs to detect and warn them of the presence of the enemy . . . Our dogs react very well under fire. They respond completely to their handlers and do nothing to betray the location of our own troops. Also, the dogs are well-behaved in the perimeter at night, remaining quiet and creating no disturbance."

The colonel was reporting on the 26th War Dog Platoon, the performance of which did a great deal to sell the dogs to the Sixth Army. Their performance on Morotai Island last year was outstanding, not for accomplishment alone but for the development of a number of principles for successful use.

The tactical situation on Morotai was ideal for the use of dogs. A minimum of large-scale organized resistance was offered by the Japanese who retreated to the interior instead, from which small parties continually harassed the Americans. A majority of the American offensive operations consisted of continuous reconnaissance and combat patrols over trails through dense jungle vegetation and over terrain varying from marshy lowlands to rough, hilly areas.

On short patrols of a few thousand yards, use of the messenger dogs provided a rapid and dependable means of communication by which the necessity of carrying radios or laying wire was eliminated. When the messenger dogs were first utilized on the island, their successful range was about 1,500 yards. This distance was eventually doubled as the dogs became accustomed to their work through their almost daily use.

On the longer patrols where radio was a necessity in order to maintain contact with the command post, the radio unit, protected by riflemen, maintained a distance of approximately 1,000 yards back of the main body of the patrol. Communications between the two were carried on by use of the messenger dog. In the event contact was made with the enemy, which frequently happened, the danger to the radio and its operator was at a minimum while communication with the command post was delayed but little.

Also, when the tropical weather occasionally put the radio equipment out of commission, the four-footed couriers were invaluable. In one instance, warning by the scout dog enabled the patrol to surprise a Japanese unit, killing four and causing the remainder to flee in disorder. The messenger

dog was dispatched to the rear with a message that the patrol had scattered for mopping-up operations; the dog made three round trips in one hour, maintaining constant communication, covering a total distance of 9,000 yards in so doing.

Some units place an armed scout in the lead with a scout dog and his handler second in line. But the patrol formation favored by one infantry regiment is for the scout dog and his handler to take the lead, followed by a scout armed with a tommy gun, followed in turn by a second armed scout and the patrol leader. The remainder follow in normal patrol fashion with the messenger dog and his handler bringing up the rear. The second handler of the messenger dog, together with the radio and guard, follow several hundred yards to the rear.

Once the scout dog alerts, indicating enemy presence, the armed scouts move up to locate the danger source, the dog and his handler dropping back to third place.

As the campaign progressed, the confidence of the men increased with each successful mission. After the patrols became accustomed to working with the dogs, they were enabled to move swiftly along the trails without fear of sniper fire or enemy ambush. In the six weeks prior to 2 November 1944 (at which time the report was made), the dogs of the 26th Platoon had led the men of the regiment on more than a hundred missions without the patrols losing a single man to enemy fire. They successfully led more than 250 patrols on the island, later information revealed.

During the operations of the regiment on Morotai, the dogs on patrol never failed to alert at less than seventy-five yards from the enemy; on occasions when conditions were favorable, they often picked up scents at more than 200 yards. This ability to smell out enemy bivouacs and troop concentrations gave the Americans the advantage of the surprise element which paid off in a big way. It was estimated that fully seventy-five percent of the Japanese killed had been taken by surprise.

A popular fallacy concerning the K-9 Corps is that a war dog distinguishes between friend and foe. Nothing could be more wrong, and for this reason the regiment did not attempt to use the dogs during mop-up operations; their constant alerting to groups of friendly troops seriously impeded the work at hand.

This same factor, however, was regarded as an advantage on the trail rather than a drawback. Patrols for the most part are working in enemy territory and must necessarily regard everything and everyone encountered as hostile until proved different by investigation. Thus the possibility of two friendly patrols unexpectedly meeting and opening fire upon each other is virtually eliminated, making this characteristic in the dog a preferable rather than an undesirable trait.

Likewise, it was found that the dogs could not be used to best advantage on cross-country patrols. With no trail to follow, it was difficult to keep the scout dog moving in the proper direction. In addition, the animals and their leashes made considerable noise moving through the underbrush.

During the period from 17 September to 2 November, the dogs from the 26th Platoon averaged three daily patrols ranging up to 8,000 yards in distance; in addition, there were three to four weekly patrols, each of which lasted two days or more. These sorties varied in size from five-man reconnaissance to sizable combat patrols of riflemen. Not a single one of these was ambushed. On the other hand, many enemy groups were surprised and routed.

Obtaining this smooth-working efficiency was not so easy as it sounds, however. Invariably, most of the handlers in newly arrived platoons are new to combat duty, skill in which is acquired only through months of experience; some are found unsuited to the rigorous demands of the job through no fault of their own. This could be remedied, it was found, by assigning such men to other duties after others, wise in scouting and combat, had been trained to replace them with the dogs.

Communications Zone--European Theater of Operations

From D-Day to February 1945

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THE purpose of this article is to bring out the changes which took place in the organization of the communications zone in the European Theater of Operations from D-Day to February 1945, and the reasons for these changes. Also to show some of the mistakes made during the operation, brought out by various observers, and how continued operations smoothed out these mistakes. This pertains only to United States activity.

The organization as it looked on D-day was as follows:

The communications zone headquarters was in the United Kingdom and under it were operating several sections. For operations in the British Isles proper there were the North Ireland Base Section, the Western Base Section, the Southern Base Section, and the Central Base Section. As can be seen later in this article, they were all in the process of being closed out to become eventually districts of one large section called the United Kingdom Base Section. For operations on the continent there were organized a forward echelon of communications zone headquarters, Base Section No. 1, and an advance section. The forward echelon was the planning agency for continental operations of the communications zone. The advance section was at this time divorced from the communications zone and was assigned to the First Army. It was to work with the army through the assault phase and remain under army control until such time as the theater commander assigned territorial responsibilities to the communications zone commander.

When the initial landings were made, less than one half of the advance section was physically affected, the reason for this being primarily, of course, that the available shipping space was utilized principally by the combat troops. A reconnaissance group of the forward echelon went to the continent on D plus 10 to get not only first-hand information of the existing problems, but also to act as an advance party for the move of the rest of the forward echelon to the continent.

Meanwhile, back at communications zone headquarters, plans were under way for the expansion of the communications zone. This resulted in the organization of two or more base sections during the latter part of June 1944. This being the transition period for the communications zone, emphasis being moved from the British Isles to the continent, the base sections on the British Isles continued to operate as districts of the United Kingdom Base Section. By 9 July 1944 all of the advance section and the balance of the forward echelon were operating on the continent. The advance section was actively operating under army control and the forward echelon was still primarily a planning agency. This condition existed until the middle of July 1944, at which time the advance section reverted back to the direct control of communications zone headquarters.

Communications zone headquarters began preparing for its move to the continent and upon its arrival there and assumption of its duties the forward echelon went out of existence, with the communications zone absorbing both its functions and personnel. Reorganization continued with many name changes taking place. To prevent confusion, it is well at this point to present the organization as it existed during the first part of October 1944 (see Figure 1). Please note that not all sections shown in Figure 1 are shown on the later chart of 18 February 1945 (Figure 2).

As can be seen from the diagram, many name changes have taken place in order to follow the policy of utilizing geographical names to facilitate recognition. Two of the

base sections had a setup that was a little unusual—the Normandy Base Section, in addition to operating on the Cherbourg Peninsula, had the responsibility of handling

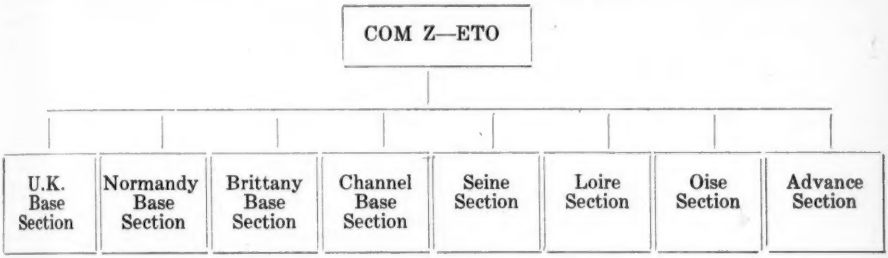

FIGURE 1.

the United States activity within the British-controlled area immediately adjacent to the Cherbourg Peninsula. The Channel Base Section was organized originally to operate within the British-controlled area specifically around the port of Le Havre, taking care of the United States activity in the vicinity. It has now moved its activity northward as shown in Figure 2. The Loire, Seine, and Oise sections were operating as intermediate sections; however, on the first of December 1944, due to the situation being such that the Brittany Base Section had not too much activity, the Loire section was abolished and its territory taken over by the Brittany Base Section. To carry this a little further to 18 February, it can be seen in Figure 2 that the Brittany Base Section was abolished and its entire territory taken over by the Normandy Base Section, with the Normandy Base Section also expanding its activities northward to include the territory in the vicinity of the port of Le Havre.

All the foregoing paragraphs deal only with our operations in the north of France and in Belgium. What about the south of France and the activity there? During the middle of August 1944 a force hit the southern shores of France and progressed against the Germans. This move was supported and controlled logistically by the Mediterranean Theater of Operations until the latter part of 1944, at which time full responsibility for the southern operations was assumed by the European Theater of Operations. The organization rendering direct support to the combat forces in this area was called the Southern Lines of Communication. It was organized to consist of two sections—the Delta Base Section and the Continental Advance Section (Conad). For all practical purposes it operated as an additional communications zone for the European theater until 12 February 1945, at which time the headquarters (Southern Lines of Communications) was abolished and the Delta Base Section and the Continental Advance Section were placed under direct control of communications zone headquarters.

Figure 2 shows the boundaries as they existed on 18 February 1945.

Many observers have visited the European theater and have analyzed its operations. In some instances, the communications zone operations were not too good, but the existing situation dictated to the greatest extent the limitations and capabilities. The plans prepared for the operations on the continent appeared well worked out and well considered, but the execution of these plans was not as contemplated, one reason for this being an overestimate of the defensive capabilities of the Germans and perhaps an underestimate of the combat capabilities of our own forces. In other words, during the initial phases, the advance of the American troops on the continent exceeded all expectations. As the Americans reached nearly

to the German border, the operation began to slow down substantially for two reasons: (1) increased German opposition, and (2) lack of supply. This is entirely logical, for as the Germans decreased the length of their supply lines, their logistic problems became easier. On the other hand, we were undergoing a very rapidly moving situation which extended our supply lines and accordingly made our logistic problems increasingly difficult. One optimistic observation was made that had our armies had sufficient gasoline and ammunition at this time, the Germans would have been unable to stop our advance. This, of course, may or may not have been true.

Several factors existed to cause this lag in our supply system. Probably the foremost of these was the one mentioned above, that is, the unexpected rapid extension of our lines of communications. This led to many other complicating factors which, all added together, had a serious effect. The rail lines west of Paris running out of the Cherbourg Peninsula proved totally inadequate to handle the tonnages of supplies needed up forward.

FIGURE 2.

This means of transportation was supplemented with motor express highways and pipelines. The pipelines suffered tremendously in their efficiency due to sabotage on the lines. The motor express highway running out of the Cherbourg Peninsula was called the "Red Ball" highway and proved most helpful. Originally it went through Paris, on into the army areas, and back again by a different route. All of it was a one-way road net. This system had a sound basis to back it up though there was a question as to the advisability of denying the use of the road to any other vehicles than the express movements. This continued until the rail system became adequate east of Paris, at which time the Red Ball express stopped at Paris. A short time later it was discontinued altogether.

Plans were made to develop a port at Lorient, but again due to the rapidly moving situation the plans were not executed in the hopes that Antwerp would fall. The delay in getting the use of Antwerp was another factor in hampering our supply operations. Antwerp was not important because it enabled us to get more supplies on the continent —rather was it important because we would be able to avoid great hauling distances and the rail bottleneck west of Paris. The net result of this situation was that while we had sufficient supplies on the continent in the port and beach areas of our base sections, it taxed every available piece of transportation we had to get to the armies barely enough on which to exist. This meant no build-up of supplies in the intermediate and advance sections. Accordingly we were unable to have supply echelonment in depth which would insure a steady adequate flow of supplies to the using units in the combat zone.

One of the other factors that has proved to be a large stumbling block is the lack of documentation and classification of supplies. This has been brought about by the fact that supply ships have glutted our cargo points to an extent over and above their capabilities to handle the cargo efficiently. The handling of supplies, of course, includes proper classification. The lack of this resulted in a more or less conglomerate mass of supplies, rather than stock piles of supplies whose identity was known. This has resulted at times in the using units in the armies getting items which they did not want or need and conversely not being able to obtain those supplies which were critically needed, because no one knew where they were.

When the port of Antwerp became available for our use, the supply situation began to clear up. About forty percent of the ton miles were saved, and the echelonment of supplies in depth became possible. The obstacle of classification and documentation is still present but will in time be overcome.

What are some of the benefits and lessons to be learned from these operations to date? To mention only a few is sufficient. Whatever the organization is at any one time, it must have flexibility to provide for and adequately take care of changes in the situation. Plans should be flexible for the same reason. In supporting our armies logistically, supplies should be echeloned both laterally and in depth. Stock control should be such as to make available to all concerned the knowledge of what supplies are on hand and where they are located regardless of their status—that is, whether they are in storage or whether they are in transit to some depot or railhead.

The greatest lesson that has been learned in this hard amphibious experience is that success or disaster on a landing operation depends almost entirely on the training of the soldier and sailor for that specific invasion, and on the infinitely painstaking preparation of every detail before the first ship sails.

—Lieutenant General Mark W. Clark,
Commander, Fifth Army

The Division Antitank Officer

CAPTAIN RUPERT G. MACPHERSON, *Infantry*

Very little literature has been written and few directives have been published on the duties of the officer in this non-T/O position created by the Commanding General, European Theater of Operations. The writer hopes, through his own experiences, to impress upon the reader the need for active, well-qualified antitank officers in every division, in training or in combat. It is too easy to put into this position an officer not professionally qualified for the important work he must do.—THE AUTHOR.

IN the European Theater of Operations, the division antitank officer is a major on the staff of the commanding general of division artillery. The commanding general of division artillery is charged with the antitank defense of the division. His antitank officer does the necessary coordinating of antitank and tank-destroyer weapons, prepares plans to meet each situation, and keeps the division "antitank conscious." The senior tank-destroyer officer in the division (usually the commander of the attached tank-destroyer battalion) is the principal adviser to the commanding general of division artillery and the division commander on the preparation of antitank plans and the employment of tank destroyers.

That is the way it is supposed to work and usually does, but let us look into the "tactics and technique" of the division antitank officer.

The antitank subsection of the artillery section of each division includes three enlisted men, one each of grades three, five, and six. The staff sergeant and corporal usually remain in the command post while the Pfc drives the antitank officer to the division command post to check with G-2 and G-3 on the situation, future plans, and operations; to regimental command posts to check with S-2 and S-3 on the local situation and to see that infantry antitank liaison is adequate and the antitank plan is effective; to antitank company command posts to check with the regimental antitank officer on infantry, antitank, tank-destroyer liaison, and plans for the future; and to tank-destroyer battalion and company command posts to check with commanders on liaison and recommendations for employment and plans for the future.

In order that he can accomplish all of the above and check positions of several guns, evaluate the terrain from an enemy tank as well as friendly antitank viewpoint, appreciate the need for daily displacement of antitank and tank-destroyer weapons to reduce the possibility of enemy observation of a static position, and keep crews on the alert, the division antitank officer must be physically active over the division front every day. His phone code name must be known to all regimental and battalion commanders and their staffs. He must be abreast of the situation at all times.

While the division antitank officer is busy covering the division front, his enlisted assistants are kept occupied at the command post. They may have their own map with the division situation brought up to date by periodic G-2 and G-3 reports, but their main worry is the "antitank" map. This is usually of a larger scale (1:25,000 or 1:50,000) than the "big picture." On this map is kept the latest reported location of all the antitank and tank-destroyer guns of the division that are in position to accomplish their primary missions. An up-to-date picture is also kept of the command post locations of all antitank and tank-destroyer units, platoon to battalion; mine fields and road blocks already placed or prepared; and terrain information such as fords, bridges, swamps, gullies, etc., that materially affect an enemy armored movement within the division zone. The locations of these guns, units, and installations, their changes of position, reports of operations, reproduction of plans on overlays, and submission of reports to higher headquarters (corps antitank officer) all tend to keep the enlisted staff of the division antitank officer busy.

The necessary evil of reports, the plague that accompanies a higher headquarters staff officer, is also present with the division antitank officer. He must receive daily reports, usually at sundown, from regimental antitank officers and tank-destroyer battalion commanders, of the location of antitank and tank-destroyer guns and a summary of operations. The summary consists of the report of contact with the enemy, missions fired and the results, losses if any, changes of command posts and gun positions, combat efficiency, and plans for the next day. These reports, except for changes of locations, can be telephoned by 2100. Overlays should reach the command post by 0900 the following morning. It must be appreciated by the reader that these reports *must* be complete and accurate. The division antitank officer must have the correct answers verbally or on his antitank map when his commanding general asks where the organic fifty-four antitank guns and attached thirty-six or more tank-destroyer guns of the combat echelons of the division are and what they are doing.

The division antitank officer cannot restrict his activities to the 57-mm guns of the infantry and the larger-caliber weapons of the attached tank-destroyers. He must coordinate his antitank plan with that of the division artillery S-3 for massed artillery fires to meet enemy tank thrusts, with the division engineer for use of mines and road blocks as well as terrain information, and with the antiaircraft artillery battalion in the event they are needed to perform their secondary (antitank) mission. He must visit the antitank officers of the divisions on his flanks and be sure that his antitank plan ties in with theirs. He must have contact with the division air section to take frequent flights over the division zone for terrain reconnaissance and to have a plane available for observation upon receipt of a "Tank Flash" warning message.

The division antitank officer can and should disseminate information on the enemy armored situation; the location and plans of friendly antitank, tank-destroyer, and tank units; and terrain studies to regimental antitank officers and tank-destroyer commanders. This can be done through his frequent visits to the various command posts, through overlays prepared by his enlisted assistants, or through a periodic antitank bulletin distributed to all antitank and tank-destroyer platoons and to attached tank and antiaircraft artillery battalions. This information disseminated should be restricted to the armored situation.

There are many times in the combat zone when the enemy armored situation is either nonexistent or quite distant. During these "lulls" for antitank personnel, the division antitank officer in conjunction with regimental and tank-destroyer battalion commanders should prepare training directives for antitank and tank-destroyer personnel. He should supervise, for the commanding general of division artillery, the conduct of this training. The antitank and tank-destroyer gun crew must be kept busy or it will go stale in these quiet situations. A few hours each day of service of the piece, improvement of emplacements, terrain studies, range estimation, and inspection of arms and equipment should be sufficient.

The writer believes that the duties of the division antitank officer come easier to an officer who has been a tank-destroyer officer, preferably a company commander and later an S-3. Such a background gives him a knowledge of antitank warfare over an area the size of the normal division zone. He has learned to apply antitank and tank-destroyer principles to map and terrain studies, route reconnaissance, and employment of weapons. He knows and appreciates the patience required of gun crews waiting for enemy tanks to appear. He is used to contacting new headquarters and officers, checking his plans with theirs, and making recommendations for the employment of his forces.

It is hoped that the above has given the reader an appreciative view of the duties of the division antitank officer and an idea of the amount of good (or harm) this officer can do for his division.

Applications of Geology to Terrain Intelligence

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IN May 1943 an abstract of a German article on military geology appeared in the MILITARY REVIEW [2] and called attention to the employment of a geological section of nine men by each German army. Every adversary of these forces has yielded reluctant admiration to their most skilful use of ground, and there is reason to believe that applications of geologic science have made substantial contributions to their successful exploitation of terrain. By their own admission, we know that they have used geology in administrative and operational problems, and it is logical to conclude that they have also found geology adapted to certain phases of military intelligence. This formal usage of military geology is presently in contrast to its somewhat indifferent use by the Army of the United States. War Department intelligence (Intelligence Division, Corps of Engineers) is being prepared by the Military Geology Unit of the United States Geological Survey, and groundwater geologists of the Survey are functioning with engineer water-supply battalions; but there has been no general recognition of a place for a geologist with combat forces. Nevertheless, some geologic techniques for field forces are being carried out by men of other sciences, such as studies on soil trafficability by certain meteorological sections of the Army Air Force.[3] Whatever the nature of the precipitation, once on the ground it becomes a geologic agent operating upon geologic materials, and only the geologist has been trained to analyze the process and its results in detail. Hence he believes that, given the weather prediction, he is far more able to foresee its effect upon terrain and mobility and operations as a whole than the meteorologist. Geologic methods of terrain analysis may reveal unsuspected wet-weather routes in advance of cross-country movement that might otherwise be found only by trial and error or through the favor of friendly inhabitants after the ground was reached; they can certainly indicate in advance of a weather forecast the most favorable of alternative dry-weather routes, or the reaction to traffic of various kinds of ground under different conditions of rainfall, on the chance that unpredicted inclement weather might overtake a field operation in progress.

Insofar as the writer's studies have been carried, only one obscure paragraph of Army doctrine (FM 21-26, paragraph 40*a*) gives recognition to this question, and it comes under the heading of "Relief" rather than "Terrain":

> As the exact nature of the terrain has a marked influence on military operations, it is important that the military commander of every unit familiarize himself with the "lay of the land" in which he is operating. This familiarity cannot always be obtained by actual reconnaissance beforehand but often must be gained solely by study of topographic maps. The map, then, must convey to the map reader a definite impression of the ground forms. *The ability to comprehend relief from the map requires an understanding of the way in which the various ground forms have been produced by nature.* (Italics are mine.—C. E. E.)

This realization of the intimate association of geologic agents with land forms, and the ability to interpret their origin and evolution from topographic and geologic maps or aerial photographs, is why the geologic method of terrain appreciation yields superior and often unsuspected technical information that may have practical tactical value, without in any way restricting the scope of other military operations. In fact, it supplements them, and its application assures that no basic factor of terrain will be overlooked.

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[1] Published with the permission of the Director, United States Geological Survey.

[2] "The Military Geologist." Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article in *Die Wehrmacht*. MILITARY REVIEW, May 1943, p. 48.

[3] Link, Major Albert E., "War and the Weather—and the Staff." MILITARY REVIEW, December 1943, p. 37.

Hence the fundamental contribution of geology to military operations is superior information. The purpose of this article is to suggest the proper place of geology in Army organization, to indicate how well prepared the structure of this organization is to receive it, and to show how geologic data are assembled and converted into intelligence.

Place of Geology in Terrain Intelligence

The mutual relationship between geology and terrain, or, as the soldier sees it, the landscape, is axiomatic. There is an equally close connection between land warfare and terrain. Without some good earth the terrain factor would not exist, as in naval warfare. Obviously, then, the common denominator of land warfare and geology is terrain. By substituting geology for terrain in the above equation, its place in our military doctrine is determined at once.

Based upon source of information, military intelligence is classified into War Department intelligence and combat intelligence. Presumably War Department intelligence is carried on in time of peace and the results obtained are furnished to the field forces prior to operations, but its activities do not terminate with the recognition of a state of war. FM 30-5, paragraph 3*b*, lists numerous topics within its scope, among them military geography and topography. Unquestionably, future revisions of the paragraph cited will include military geology, because the resolving power of geologic analysis, especially with respect to terrain, is much more definitive than that of the pseudo-science of geography. War Department intelligence is the very foundation of geologic terrain analysis. Without large, highly specialized libraries rich in geologic and topographic maps of all lands, scientific and technical publications of all kinds and in all languages, and a competent analytical staff, the basic compilations could not be made.

Combat intelligence is derived from the interpretation of military information in the field in the presence of the enemy, and its chief concern "is to reduce as far as possible uncertainties regarding the enemy and local conditions and thus assist the commander in making a decision and the troops in executing their assigned mission" (FM 30-5, paragraph 5*a*). The application of this phase of intelligence seems to have been overlooked completely. When focused through an intelligence plan, the method of geologic terrain analysis constitutes a most powerful tool whose results may be either deductive or simply descriptive. This is especially true when it becomes necessary to supplement incomplete information of the enemy's dispositions by evaluation of his utilization of terrain. German or German-trained forces, and possibly the Japanese, would seem to be particularly vulnerable to this technique. Under their doctrine it is entirely possible that a military geologist may have been consulted when their arrangements were made. Hence, unless the exigencies of a tactical situation expressly forbid it, one may expect their positions to be outlined by both the form and substance of terrain. Prepared positions almost certainly will be influenced by such control. Counter-intelligence thus demands that estimates of the enemy dispositions be reviewed by our military geologists, who will at least be conversant with the governing factors of the ground. A convenient testing procedure would be to overlay enemy situation maps, insofar as the situation is known, on the various types of terrain maps described in the next section. Other essential elements of information, such as prediction of unknown details or obstacles in enemy-held terrain that may affect our own maneuver, should be even more amenable to geologic methods of terrain appreciation. The technique may also help to define enemy capabilities by outlining unsuspected routes of approach and conditions of mobility, and so deprive hostile attack of the major elements of surprise—place and time. Without further discussion it may be said in summary that geology has a direct application to the commander's estimate of the situation through the medium of terrain intelligence.

Inasmuch as the military geologist can develop his tactical value most effectively through his contributions to combat intelli-

gence, it seems logical that he should function through the intelligence section of the unit to which he is attached, and because of his preoccupation with information relating almost exclusively to some aspect of terrain it is even more appropriate that his duties be correlated with engineer intelligence. This is the ideal situation because it makes his services available for both tactical and administrative circumstances. The increased scope of these activities will result in the development of additional geologic information and better integration of that available, for it is inherent in geology that the key to a particular question often is discovered miles from the locality where the problem developed. Hence the military geologist should be allowed unusual freedom of movement within his lines for more or less continuous investigation. When requests for terrain reconnaissance are made, the unit intelligence officer should route them through the military geologist for suggestions as to additional items for observation, or for his participation in the patrol. With this possibility in mind, it may be worth while to consider the advisability of revising FM 5-5,[4] paragraph 286*c*, *Means of securing information*, to include geologic information; and geologic reconnaissance might be mentioned in the list of special types of reconnaissance, FM 5-5, paragraph 287*c*.

Technique of Geologic Terrain Analysis

Much sound material has been written on the technique of geologic terrain analysis, especially "*Geologische und militärgeologische Karten*" by Major Erich Sonne,[5] former Inspector of Fortifications, Western Front, and it is doubtful if any fundamental improvements will be made soon. Future developments will be largely of the nature of refinements or greater application of detail as larger-scale maps are used for smaller military units, and extension of technique to new problems. Basically the method is an intelligence operation and in some ways the procedure corresponds to that used for the formulation of an intelligence plan.

Inasmuch as more of a region can be visualized at one time on a map than on the ground, the foundation of the analysis is a chart showing the different kinds of rocks and their relationships. Such a sheet is called a lithologic or geologic map, and is more indispensable to the military geologist than a topographic map because, in addition to the geology, it always contains information on terrain not determinable from a topographic sheet of the same area, and besides, many topographic details can be deduced from it. Geologic maps are now available for most of the land surface of the earth, and are always susceptible to refinement as the scale is enlarged. However, if the area to be studied is not so covered, a geologic map will have to be made. A topographic map is also a great help, and the ideal combination is a geologic map on a topographic base. Although aerial photographs are not maps in a strict sense, they make acceptable substitutes for topographic maps, and may show much geologic detail, or serve as a base for geologic mapping. With these materials, and his professional knowledge of petrology (the science of rocks), structural geology, process and stage, the military geologist is now ready to develop such essential elements of information relative to terrain as his commander deems necessary for his intelligence plan.

> The essential elements of information constitute the basis for orders governing the search for information (FM 100-5, paragraph 191).

Army doctrine on essential elements of information indicates clearly that some of them are susceptible to geologic analysis:

> Essential elements of information for the unit intelligence plan include not only the information required for planning operations of the unit, but also the information required for operations as a whole of the higher units of which it is a part. The elements of information required by an engineer unit may relate

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[4] References to FM 5-5 are to Engineer Field Manual, Troops and Operations, edition of 31 January 1941.

[5] *Preuss. Geol., Landesanstalt, Jahrb. 1935*, Bd. 56, Heft 1, pp. 192-195.

to hostile forces *but usually they are related to the terrain, natural and commercial resources, and are technical in character.* Determination of the essential elements cannot be made without a thorough understanding of the tactical situation and the expected employment of the engineers. Essential elements of information change with the situation and must be redetermined as often as necessary. (FM 5-5, paragraph 286 *b.*) (Italics are mine.—C. E. E.)

Without exception the essential elements of geologic information can be segregated and illustrated by means of maps. Among the various kinds of geologic maps that have been made to focus the activities of intelligence agencies on the items of information needed to complete a plan or to carry out a decision are the following: water supply, surface waters (lakes and rivers), mobility or route, workability of ground, subsurface drainage, coastal conditions, construction materials, economic geology, and so on. These elements are further analyzed into specific indications by means of a tabular form and cross references to the map by means of appropriate symbols. For example: the geologic map illustrating Major Sonne's article shows three formations that have been subdivided into a total of eight map units. On the corresponding table they are arranged in natural sequential order (youngest at the top). Columns on the left side of the sheet give (1) map color and symbols, and (2) geologic formation names. Other columns to the right list the principal and special characteristics of the formations with respect to military operations, as (3) kinds of rock; (4) water-bearing, sound-conducting; (5) occurrence of vegetation; (6) approximate thickness; (7) workability (five classes are listed, ranging from workability by spades to compressed-air drill with continual blasting); (8) stability (with respect to rainwash); (9) military usefulness (chiefly with respect to concrete aggregate and construction materials); (10) expected exfoliation around reinforced concrete construction; (11) behavior when wet; (12) foundation excavations, trenches; (13) underground mines, dugouts; (14) drainage conditions; (15) practicability for roads, including infantry. Thus a few words or a figure in each box summarizes some particular character, and a glance at the map indicates whether or not it affects the locality considered.

Space does not permit description of other more specialized types of maps and their individual schedules. Obviously, however, a terrain-evaluation folio containing a topographic and a geologic map, together with the series of supplementary maps or overlays that the situation demands, makes a practically inexhaustible handbook on terrain for the ground so covered. Some information is available immediately on almost any military problem involving terrain, whether it be fluctuation of the ground-water table at a prospective airdrome location, bearing power of soil at the site of heavy guns, route location with respect to material for construction and maintenance, effects of artillery fire on ground, or the characteristics of fringing and barrier coral reefs in amphibious operations.

Useful as they may be, however, the folios alone are of limited value because the technical information they contain will usually require individual interpretation or adaptation to specific local situations, as well as constant attention in the way of additions, corrections, and regrouping of information to meet changing or unforeseen events. This can be done effectively only by a man on the ground—at the front—the specially trained military geologist functioning through engineer intelligence.

To move swiftly, strike vigorously, and secure all the fruits of victory is the secret of successful war.

—General Thomas J. (Stonewall) Jackson

Reinforcing Artillery

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THIS article concerns the employment and organization of the artillery above the division level, and the coordination of artillery fires by the higher command. It is based on combat observations and lessons which agree remarkably well with present-day teachings; however, it is not intended to set forth any laws. Its purpose is to analyze, for those not well acquainted with higher echelon artillery, the manipulation of that artillery. We will divide the discussion into two main phases, first considering the subject from the army level and then from the corps level.

First of all, to define some terms that we shall use throughout this article so that we will all be speaking the same language. The term "reinforcing artillery" we will consider as applying to all the artillery available *except* that organic to the division. The term will apply whether the artillery is attached to army, corps, or the divisions. It excludes only three light battalions and one medium battalion organic to each infantry division. The organization of reinforcing artillery is very flexible. It may consist of artillery brigades, groups, and separate battalions. A group will consist of a headquarters and two or more battalions. These battalions may be of the same or different calibers and types. A brigade will consist of a brigade headquarters and such groups or separate battalions as are attached to it. The composition either of groups or of brigades may be changed from time to time. We will consider the functions of brigades and groups later. To continue with our definitions:

We will use the term "corps artillery" and "artillery with the corps." The term "corps artillery" will apply only to that artillery retained under direct corps command and will exclude organic divisional artillery units and artillery attached to the divisions. The term "artillery with the corps" will apply to *all* artillery within the corps, including special units functioning as artillery.

In classification of artillery missions, we will speak of artillery firing "close support" missions and "deep support" missions. These terms are almost self-explanatory—"close support" missions are those fires placed on hostile installations that are directly in front of our infantry; "deep support" missions are fired deep into the hostile area and placed on enemy batteries, command posts, communications, transportation routes, etc.

Artillery can be organized for combat in several ways. It can be used in direct support, in general support, as attached artillery, or in a reinforcing role. In definition as applied to army or corps artillery:

Direct support.—Direct support artillery is retained under the control of the artillery commander, but operates primarily with and for the supported unit. If the maneuver of the supported unit makes it necessary for the direct support artillery to displace to provide proper support, that artillery displaces without order from its higher headquarters and reports that it is doing so.

General support.—General support artillery is retained under control of the higher artillery commander for employment anywhere in the sector of operation of the unit as a whole.

Attachment.—When an artillery unit is attached to any other organization, the higher commander relinquishes direct control of that artillery and it becomes as much a part of the unit to which it is attached as are the organic organizations of that unit.

Reinforcing.—An artillery unit given the mission of reinforcing the fires of another unit establishes liaison with that unit and gives the reinforced unit priority in calling for fires unless it is firing a general support mission. It remains under control of the higher commander.

With those terms in mind, let us now consider the functioning of the army artillery. Here there are several principles to consider. It must be remembered that there is no artillery organic to units higher than divi-

sions; that organic division artillery is sufficient only under the most favorable of conditions, and that additional artillery normally will be allotted dependent upon the availability and the needs. Artillery is allot-

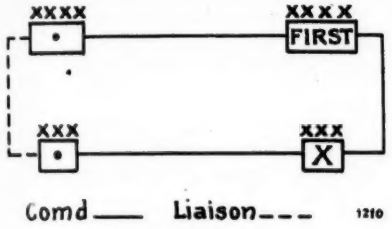

FIGURE 1.

ted to theaters from War Department reserve. Theater commanders in turn allot artillery to armies in accordance with the assigned jobs to be done. This assignment of artillery is changed by the theater commander as the tactical situation changes.

Now army may retain some of this allotted artillery under its control, but this is exceptional. Normally, army will attach the War Department reserve artillery to the various subordinate corps in accordance with army's estimate of their needs, based on the army's plan, and will change these attachments as these needs change.

In our tables of organization, we have no organic army artillery headquarters or artillery units. On the special staff of the army commander, we have the army artillery officer, a brigadier general. He is the one artillery special staff officer that does not function in a dual capacity. He has no tactical command function and acts purely as the artillery adviser to the army commander. Should the unusual happen and army retain control of some artillery units, they will be under command of the senior artillery commander, not the army artillery officer. He has no tactical command. He would, however, assign the mission to the artillery retained under army control.

There is no direct artillery chain of command from army to corps, nor from corps to the divisions. All instructions for the artillery with the corps are issued in the name of the army commander. Command and liaison channels are illustrated diagrammatically in Figure 1.

Notice that command channels require that instructions to the corps artillery be from the army commander through the corps commander. Notice further that the army artillery officer does establish liaison with the corps artillery and no doubt would be authorized to give direct instruction on some matters to the corps artillery but in the name of the army commander.

The army artillery officer is responsible for keeping the army commander informed as to the limitations and capabilities of the artillery, recommendations as to the employment of the artillery, and estimates as to the artillery requirements. He is assisted by a special staff section of nineteen officers and forty enlisted men. Remembering that this is a special staff *section* of an army general staff, its function is purely advisory and its principal job that of anticipatory planning. It is divided into the normal staff S-1, S-2, S-3, and S-4 sections with responsibilities as indicated in Figure 2.

The army artillery officer and his staff formulate the army artillery plan, based on recommendations approved by the army commander. The artillery plan should include:

1. Artillery organization for combat. What artillery units are to be attached to whom? Where? When?

2. Assignment of general artillery missions. Delegation of artillery responsibilities of general nature.

3. Coordination of movement of artillery units with other essential movements.

4. Coordination of artillery with the Navy or air forces. Particularly important in amphibious operations. Requires detailed planning and cooperation for success.

5. Coordination of operations of the subordinate units, including ammunition allocations; map, photomap, and photograph supply; survey; and collection and dissemination of general information pertaining to hostile artillery.

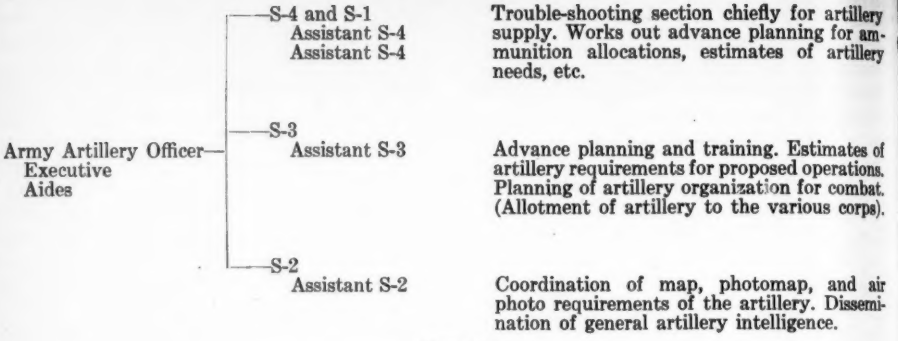
Army Artillery Officer
Executive
Aides
S-4 and S-1
Assistant S-4
Assistant S-4
Trouble-shooting section chiefly for artillery supply. Works out advance planning for ammunition allocations, estimates of artillery needs, etc.
S-3
Assistant S-3
Advance planning and training. Estimates of artillery requirements for proposed operations. Planning of artillery organization for combat. (Allotment of artillery to the various corps).
S-2
Assistant S-2
Coordination of map, photomap, and air photo requirements of the artillery. Dissemination of general artillery intelligence.

FIGURE 2.
ARMY ARTILLERY SPECIAL STAFF SECTION (TYPICAL).

In attaching artillery to corps, the army artillery officer must consider the following factors:

1. Availability and type of artillery.—Of the artillery available, what types are best suited for the various artillery jobs to be done?

2. The army scheme of maneuver and the missions of the various corps.—He will, of course, weigh the corps making the main effort and shift artillery attachments from any corps in reserve.

3. Subsequent operations.—He must anticipate future operations so that he can promptly make any artillery shifts necessary and give subordinate commanders sufficient time to make their plans.

We have concluded a summary of the very basic elements of artillery organization and employment at the army level. Let us now consider the problem from the corps viewpoint.

At the corps level, the artillery officer has a dual capacity. He is the artillery officer on the special staff of the corps commander and he is the commander of the corps artillery. It has been recommended quite often that this dual role be broken up. It is felt by some that the need exists for two separate officers, one to command the corps artillery and one to act as artillery adviser to the corps commander. So far, at least, the change has not been made and we still have the corps artillery officer, a brigadier general, doing two man-sized jobs.

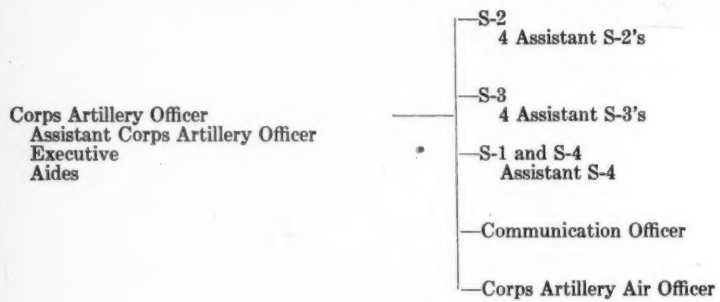

FIGURE 3.
ORGANIZATION OF THE CORPS ARTILLERY STAFF (TYPICAL).

The duties of the corps artillery officer include:

1. Keeping the corps commander advised as to the employment of the artillery with the corps to best fit the corps scheme of maneuver.

2. Preparing plans for the general employment of the artillery with the corps, plans for the organization, employment, and technical supervision of the corps artillery, and the coordination of these plans with those of adjacent corps.

3. Preparing the necessary orders and annexes to put approved plans into effect.

To assist him in his work, the corps artillery officer has a staff of twenty-three officers and eighty-nine enlisted men. A typical organization of the corps artillery staff is illustrated in Figure 3.

The responsibilities of these staff sections agree generally with those of other staffs, but let us consider some of the duties peculiar to the corps artillery.

First, the S-2 section: As we will see later, one of the most important tasks of the corps artillery is the neutralization of hostile artillery. The most difficult portion of the accomplishment of this job is the locating of the hostile batteries. One of the assistant S-2's has this responsibility and functions as the counterbattery intelligence (CBI) officer. Information regarding the location of hostile artillery is received from air observation, air photos, artillery and infantry observation posts, shell reports, captured documents, interrogation of prisoners of war and civilians, and from operation of the corps artillery sound and flash battalion. The information is compiled and disseminated by the corps CBI officer. It might be well to mention here that the British are doing particularly excellent work in not only counterbattery intelligence but countermortar as well. Their T/O's now include an organization especially trained for this work. They have succeeded in training all of their troops in the importance of rapid submission of accurate shell reports (a point that we have emphasized far too little).

Next, our corps artillery S-3 section. This section's primary responsibility is the coordination of fires of the artillery with the corps and the assignment of specific missions to the corps artillery. The assistant S-3's include liaison officers sent to the various division artillery headquarters.

Our S-1 and S-4 section's biggest headache is ammunition supply and particularly prior planning, the estimation of artillery ammunition requirements and the allocation of ammunition to the various artillery units.

While discussing the army phase of reinforcing artillery, we learned that this artillery was rarely retained under army control, but was allotted by direct attachment to the various corps. We learned further that this artillery may be organized as brigades, groups, or separate battalions of various types and calibers. Before going

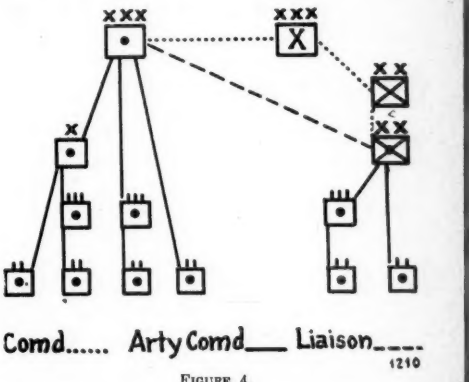

FIGURE 4.

further, let us see how these echelons of command fit into the big picture. Figure 4 illustrates diagrammatically the level of command occupied by the various headquarters. Bear in mind that this figure is entirely diagrammatic and does not illustrate any set organization. It is intended to show level of command only.

Notice particularly that corps artillery may have command of separate battalions, of groups of battalions, and of brigades composed of either groups or separate battalions. The composition of groups or brigades is very flexible and follows no set

pattern. Notice also that the brigade headquarters is at about the same echelon or level of command as is the division artillery headquarters.

There we have the corps artillery officer's staff and the types of organizations he might expect to work with. Now let us look at a few of the corps artillery officer's problems and actions. First, he must recommend how much and what type of artillery is to be retained under corps control and how much is to be attached to the divisions. In making this recommendation he considers the following factors: (1) availability and type of artillery and the availability of control headquarters; (2) missions of the divisions—here again, the unit making the main effort will rate the bulk of the artillery support, those in reserve very little artillery allotment; (3) the army artillery plan—the corps commander's plan is, of course, based on that of the army, and the corps artillery officer must arrange his artillery to support the corps operation; (4) centralized control versus decentralized control—as is the case in the division artillery, corps artillery functions best under corps control and the same difficulties as in centralized control present themselves, those of distance, separation of units, terrain difficulties, and communication difficulties. In addition, the corps artillery officer is confronted by the problem of maintaining centralized control to the maximum with the control agencies available. It has been found that a control headquarters can efficiently operate four units and four only (example: four battalions under a group headquarters). If no separate control agency exists, it is not wise to group more than two units (example: two battalions with one battalion headquarters designated as in control). Let me illustrate further. In one phase of the Sicilian operation we had a medium battalion attached to our light direct support battalion and the arrangement worked very well. Except for the matter of command, the medium battalion functioned much in its normal reinforcing role. A little later we were further reinforced by the attachment of additional artillery and the whole setup came near to breaking down. We just didn't have the necessary command or communication facilities, nor the necessary control personnel. Out of fairness, let me say that we functioned after a fashion, but we all realized that it was not the most efficient setup imaginable. Had a group headquarters been available to take control of the attached units with the mission of reinforcing our fires, I think the approved solution would have been reached.

Now we have been discussing the attachment of artillery from army to corps and from corps to divisions; and yet massed fire and centralized artillery control has received great emphasis in this war, and in planning the organization for combat of the division artillery we know that artillery should be attached only when absolutely necessary and

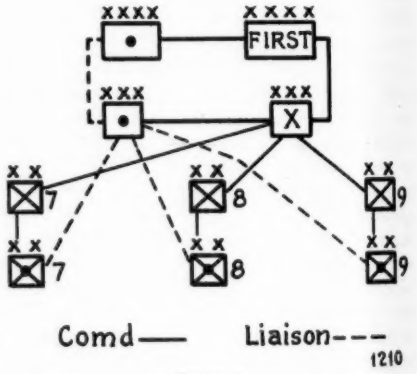

FIGURE 5.

then for as short a time as possible. When considering the organization of the division artillery, that principal is entirely correct—attach only when necessary. With the organization of the artillery of a higher level than that of the division, we have quite a different picture, however. In the first place, artillery attached from army or from corps to the next lower echelon is attached to other artillery units and control is not completely lost. It is like putting a dollar in the bank—you still have control over it and can use it when you want to, but you have allowed the banker the use of it until such time

as you need it. In other words, you, as corps artillery officer, can, for example, attach an artillery unit under your direct control to another artillery unit that you control through the corps commander. To illustrate the command and liaison channels, let us carry the diagram in Figure 1 a step further to include, in Figure 5, the relationship between corps and the divisions.

Notice in Figure 5 that although the command channels are from corps artillery through the corps commander and the division commanders to the division artillery, direct liaison from the corps artillery officer to the division artillery officer is established and the corps artillery officer is able to exercise some control over the division artillery units.

The guiding principle for the attachment of artillery in the higher command levels is, then, "who can best exercise control?" In other words, what organization for combat will provide the maximum quick support to the front-line troops?

To get back to the corps artillery officer. After having decided how much artillery he is going to retain as corps artillery, that is, artillery under direct corps control, and how much he is going to attach to division, what other problems does he have? His next problem is the planning of fires in support of the unit as a whole, and here he must consider the missions of the corps artillery. These fall into two major classes: (1) corps artillery fires in support of the corps as a whole, and (2) corps artillery fires reinforcing the fires of the division artillery. We shall discuss these missions in order. First, corps artillery in support of the unit as a whole. Under this classification we have counterbattery, long-range interdiction, and what we might term "deep supporting" missions. By assuming responsibility for these missions, corps relieves the division artillery units and allows them to provide the maximum of close support fire to the assaulting troops. Corps sets up and operates a fire direction center, very similar to that set up by division artillery, to control the corps artillery fires. A good solution is to set up what we might call a "counterbattery headquarters" in addition to the normal fire direction center to fire all counterbattery missions. This setup has the advantage of controlling counterbattery fires for retaining surprise. For example, in one phase of the British march across Africa, information regarding the location of German batteries was piled up for several days prior to an attack. Firing on these batteries was purposely avoided even though they were inflicting casualties. As information increased, the locations were verified till at the time of attack the bulk of the German batteries were definitely located, and because they had not been fired on, they considered themselves undiscovered and remained in position. Prior to the attack, an artillery preparation of several hours was fired. The counterbattery portion of the preparation was so effective that the attack met almost no hostile artillery fire.

The second classification—fires reinforcing the division artillery—constitutes the *bulk* of the corps artillery missions. They include reinforcing fires placed on targets reported by division artillery observers and fired on call, and fires requested by divisions on prearranged schedules. The *bulk* of the targets located, especially during the attack, will be by divisional agencies. In fact, the keystone of the whole system of artillery support is the direct support battalions because of their systems of liaison with forward attacking troops and because of their interlocking observation and communications system.

Another thought on this direct support battalion: All plans in the army initiate with the higher echelon and each succeeding lower unit makes its plans to conform. Artillery planning is done the same way, but the man who needs the artillery support is the man in the front-line foxhole and provisions must be made to give him this support, and quickly. He obtains this support initially through his direct support battalion, and for this reason the direct support battalion becomes the keystone of the whole artillery support. Provisions must be made to give this battalion fire

priorities and plenty of leeway in request for additional fire.

The next thing the corps artillery officer must think of is his plans for coordinating the fires of the artillery with the corps, including communications, ammunition supply, and survey. The lifelines of the artillery are its communication lines; the communication nets are very complex and increase in complexity with the higher units. Control cannot be effected without adequate communications. Ammunition supply plans must be coordinated with adjacent higher and lower units. Massing of fires of corps units is possible only if corps units are tied in with common survey, and corps artillery can effectively reinforce the division artillery units only if the divisional units are also tied into the survey. The corps field artillery observation battalion accomplishes this survey job by establishing the basic survey for the corps artillery and marks the points of origin for the survey of the division artillery.

The last but by no means the least factor that the corps artillery officer must consider in making his plans is the factor of time. I have purposely left this factor of time to the last in my discussion so that you might see how this element alone can affect all of the other elements of the corps artillery officer's planning. Let us review the factors that we have considered and see how time can affect them. (1) Organization for combat—the corps artillery officer must plan and publish his artillery plan in sufficient time for the subordinate commanders to make their own plans. Time and space must be considered—it may be that a desired attachment cannot be made because there is insufficient time for the unit to arrive at the proper place. (2) The factor of fire planning—how is it affected by time? Does time exist for minute detailed planning or must planning be of a general nature? The fire planning of the corps artillery and the coordination of the fires of the artillery with the corps takes considerable time to consider in detail and the plans must be completed in time to support the contemplated action. Plans are as detailed as is consistent with the time available. (3) The technical plans for coordinating the fires of the artillery with the corps—is there time available to install the necessary communications? Is there time to accomplish the survey necessary to link the desired units? Is there time to haul the required amounts of ammunition? All of these things must be considered under the factor of time.

Now let us summarize briefly: Reinforcing artillery—the additional artillery support needed for combat—is obtained through channels from War Department reserve. Since army rarely retains control of any of this artillery but instead passes it on by attachment to corps, the manipulation of this additional support is usually a corps command function. The corps artillery commander, acting in the name of the corps commander, coordinates the use of his artillery to reinforce the artillery of the divisions. He does this by direct attachment of artillery to the division artilleries, and by arrangements to reinforce the division artillery fires with the fires of the artillery remaining under his control. He will normally retain control of the bulk of the heavy and medium artillery units and attach some of the medium and all of the light units to the divisions.

Often, indeed, after a successful war, the victor has fallen asleep in a fallacious assurance of his superiority, while his opponent, striving to work out the causes of his defeat, struggles to recover from it. Hence the victor of today becomes the vanquished of tomorrow.

—Turenne

"Adm O 8, 1000"

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LIEUTENANT COLONEL S. B. WUERTENBERGER, *Coast Artillery Corps*
Instructors, Command and General Staff School

THE authors, members of the Logistics Section of the Faculty of the Command and General Staff School, have been teaching the subjects of Administrative Plans and Orders for more than a year. During this time many copies of Administrative Orders from overseas organizations have been examined by them. These orders have been written by ground units from divisions to armies in size. They have demonstrated almost as many varieties of forms and techniques as they represented units. They have ranged from four to eleven paragraphs, from a few pages to a volume over an inch thick, from a wide use of abbreviations to a verbosity that was Thackerian in style.

The authors have not a single charge to make that these orders "did not work." The success of our arms in all theaters is the proof of the pudding in that case. It is felt, however, that the efficiency with which these orders "worked" would have been enhanced by the application of a more standard form and technique of preparation. The authors do feel that the troops do not desire a puzzle with each and every order!

What is an Administrative Order? An Administrative Order is the vehicle by which the commander transmits his Administrative Plan to his command for execution. It is an *independent order* and should not be issued as an annex to a Field Order.

The basic form for an Administrative Order is that commonly referred to as the *complete written Administrative Order*. In this form all details are written into the body of the order. A familiarity with this form is fundamental to an understanding of all types of Administrative Orders.

The overlay type of Administrative Order takes advantage of the graphic techniques in that every item that can be so portrayed appears on the overlay. The complete order, however, will generally require a written portion to supplement the graphic part.

The administrative sketch parallels the overlay order except that the graphic portion is not necessarily drawn to scale and bears no direct relationship to any map.

A great deal of administrative information which troops receive in the field comes to them in fragmentary form: written, dictated, or oral messages, fragmentary sketches or overlays, or paragraph 4 of Field Orders.

Administrative items which are permanent or semipermanent in nature should be made available to the troops in the form of an Administrative SOP, thus relieving the Administrative Order of the burden of repetitive detail.

1st Inf Div
KASTENREUTH (T3092) GERMANY
1200, 13 Feb 45
(or 131200 Feb 45)

ADM O 14 To accompany FO 18
Maps: GERMANY 1:100,000, U-5

FIGURE 1.

Proper organization of the Administrative Order is essential to its efficiency. The heading (see Figure 1) indicates the issuing unit (the designation "Hq" is superfluous), the location of the command post, and the hour and date of issue. Administrative Orders are numbered serially. If the Administrative Order is physically to accompany the Field Order, a notation to this effect should be made following the serial number of the Administrative Order. On the next line should be noted all maps, reference to which is essential for an understanding of the details of the order.

The body of the order is divided into six main paragraphs on the basis of subject matter. The first main paragraph should contain items pertaining to supply. This paragraph is divided into subparagraphs each dealing with a type of supply such as rations, ammunition, water, engineer, gasoline, etc. These subparagraphs are further divided into such details as location of supply points, units served, and quantities stocked and issued, thus:

I. SUPPLY
a. *Rations*
(1)----------

(2)----------
b. *Ammunition*
(1)----------
(2)----------
c. *Engineer*
(1)----------
(2)----------
d. *Water*
(1)----------
(2)----------

In large units, comparable to armies, for which the Administrative Order must carry a complexity of detail, it is desirable to divide paragraph 1 in terms of the services. Each of these is subdivided by classes of supply, as follows:

I. SUPPLY
a. *Quartermaster*
(1) Cl I
(a)----------
(2) Cl II and IV
(3) Cl III
b. *Ordnance*
(1) Cl V
(a)----------
(2) Dep
c. *Engineer*
(1) SP(s) ----------
(2) Dep----------
d. *Signal*
e. *Medical*

Paragraph 2 of the order deals with evacuation. Its subparagraphs deal with casualties which may be personnel, matériel, or animals; buri. s; prisoners of war; salvage; captured matériel; civilians; etc. All of these are further subdivided to cover pertinent details such as collecting points and responsibility for evacuation.

Paragraph 3 is entitled "Traffic." Under this heading are grouped such related items as main supply road, traffic restrictions, traffic control, and priorities of movement. All information dealing with administrative movement is included in this third main paragraph. Under specialized conditions, then, there would be subparagraphs for movements by rail, water, and air. (See discussion on annexes below.)

The fourth main paragraph is headed "Service Troops and Trains." Here are made the assignments to bivouac areas for service units retained under the control of the headquarters issuing the order. General geographical restrictions on the service areas of subordinate units may also be covered. Other subparagraphs make or change the missions or attachments of service units to lower echelons.

In the fifth main paragraph, which carries the title "Personnel," are grouped the bulk of G-1's responsibilities in connection with the Administrative Plan. In separate subparagraphs, information is disseminated on stragglers, mail, strength reports, and replacements. In addition, separate subparagraphs may be allotted to shelter and baggage.

Paragraph 6 is headed "Miscellaneous," and is intended to include administrative items which do not properly fall into any of the classifications enumerated above. Caution should be exercised in the use of this paragraph, as practically all administrative matters do come under one or more of the categories listed in the first five paragraphs. Items concerning the location of the rear echelon of the headquarters and the location of the rear boundary quite properly belong here.

BAKER
Maj Gen

OFFICIAL:
/Signed/Jones
G-4

Annexes:
1. Quartermaster
2. Ordnance
3. Medical

Distr: A
901st AAA AW Bn, SP
909th TD Bn

FIGURE 2.

The original copy of the Administrative Order is signed by the commanding general. Those copies prepared for distribution to the troops carry the commander's last name and rank in lieu of the signature and are authenticated by G-4 (see Figure 2).

Following the authentication, the order should carry a list of the annexes that are to accompany it. If any such annexes are to be issued, reference should be made to them in the appropriate paragraph or subparagraph in the body of the order. Without such a reference, doubt will exist as to whether or not particular information is included in the order. Annexes must be used in order to relieve the body of the order of a mass of technical detail and to facilitate both the preparation of the order and the reading of it.

Following the list of annexes, the distribution of the order will be shown. Distribution within the parent unit may be indicated by a standard distribution system. Care must be taken that any attached units are included in the list of distribution.

The final test which any Administrative Order must meet is the answer to the question "Can it be misunderstood?" To pass this test, the order must have the characteristics of completeness, clarity, and brevity. There are certain techniques to be employed in the preparation of an Administrative Order which, when used properly, give to the order these three characteristics. Before these techniques are detailed, it should be noted that rigid adherence to any may result in the negation of the desired result. Uniformity of both form and technique is a superior virtue to any single technique. Nevertheless, an Administrative Order can be improved by the proper application of the points which follow:

1. Restrict the order to six main paragraphs.

2. Capitalize the main paragraph headings.

3. Underline subparagraph headings.

4. Do not abbreviate paragraph or subparagraph headings.

5. Throughout the remainder of the order use abbreviations—use only authorized abbreviations. Since there are a number of publications listing abbreviations, it is recommended that FM 21-30 be used as the authority for abbreviations for combat orders. Either the use of only authorized abbreviations should be adhered to strictly or abbreviations discarded entirely—and this takes the punch out of an order.

6. Use coordinates to fix the identity of all geographic names or localities. It is recommended that these be used *each* time the place is designated to obviate the necessity for the reader to scan back through the order looking for a previous designation.

7. Capitalize all geographic names and localities.

8. A time of opening should be shown for all installations which will open after the time the order is signed.

9. If a time mentioned in the order is on a date following the date of the order, then the hour and date should be shown.

10. Affirmative phrases should be used.

11. Technical language should be avoided in the body of the order. Where it must be employed, it should be included in an annex dealing with the subject.

The form and technique discussed above is applicable to the other types of Administrative Orders.

When an overlay type order is used, that information which can not be shown graphically is written in accord with the above. The caution made in respect to abbreviations applies equally well to the graphic portion of the overlay, and only the symbols authorized by FM 21-30 should be used.

A fragmentary order employs the standard technique of message writing but the sequence of items in the message is that of the complete written Administrative Order.

Likewise, the information prepared by G-4 for paragraph 4 of the Field Order must employ the techniques of the Field Order but the sequence of items listed must be that of the Administrative Order.

There is no unassailable virtue inherent in the form and techniques discussed in this article. There is an unassailable virtue inherent in the consistency, clarity, brevity, and completeness which this form and these techniques will give to Administrative Orders. The profit lies in the facility with which such orders can be translated from the theory of an Administrative Plan to the actuality of proper logistical support. That is the reason for Administrative Orders. That is the reason for this article.

The Cargo Security Officers Detachment

LIEUTENANT MERTON R. HUBBARD, *Quartermaster Corps*

THE "Ferryboat Boys" are the handymen of the Transportation Corps. More formally known as cargo security officers, they are soldiers, sailors, diplomats, storekeepers, and watch dogs for the overseas shipments of every arm and service of the Army Service Forces.

This detachment is composed chiefly of second lieutenants and a handful of first lieutenants who travel around the world on cargo ships. Since May 1943, when the first officers were sent overseas in this unit, they have visited every theater of operations.

The tour of duty of the cargo security officer commences at the port of embarkation when a cargo ship ties up for loading. He is present during all loading operations as a special assistant to the loading officer and the master in forestalling mishandling and pilferage of army cargo. All documents relating to the cargo, such as the manifests and stowage plans, are left in his care. Before sailing, he and the master check the security of all hatches and the proper lashing of deck cargo.

During the voyage, daily inspections of accessible cargo and lashings are made, usually with the cooperation of the chief mate or boatswain. The master is solely responsible for the operation and safety of the ship, as well as for the crew and cargo, but it frequently happens that the cargo security officer is called upon for advice regarding the disposition of army cargo during emergencies. On one ship, an M4 tank tore loose from its lashings during heavy weather, and pushed its nose through the side of the ship. In a quick conference, the CSO and the master agreed to cut the tank loose and let it go over the side rather than allow it to smash up the other cargo within the hold. Another ship carrying P-51 planes on deck encountered a storm so violent that three of the planes were torn off the deck and left hanging part way over the side. The CSO and the master decided to chance losing their convoy by swinging the ship into the wind long enough to make repairs. The CSO and the boatswain secured themselves to life lines and went out on deck to relash the planes, amid thundering waves.

Many of the cargo security officers supplement their regular daily duties with voluntary services to the master or the gunnery officer. It is not unusual to find the cargo security officer standing watch on the bridge beside the mate; nor is it unusual to find a cargo security officer strapped into an Oerlikon 20-mm antiaircraft gun, or passing shells on the other guns. At least one cargo security officer has been decorated for service above and beyond the call of duty as ship's doctor; others have been commended for bravery under fire.

In addition to their cargo security duties, many of the officers are appointed transport commanders on those ships carrying troops on the voyage outbound, or prisoners on the voyage inbound. In such cases he acts as liaison between the master of the vessel and the troops or prisoners on board, and works with those concerned with such problems as quartering, messing, light and water, discipline, fire and boat drill, and general emergencies, as well as operating a sales commissary for the troops. During the voyage the cargo security officer acts also as a war correspondent, recording unusual events or enemy action.

If the voyage has been a peaceful one, the real headaches of the cargo security officer commence when the ship reaches its destination. His first job is to deliver all documents to the port commander along with any special cargo which has been entrusted to his care. This accomplished, he must watch the unloading operations from start to finish, assisting the unloading officer by furnishing information as to the nature and stowage of the cargo, and by maintaining a vigilant lookout for mishandling and pilferage. He may request guards to assist him in this, but if guards are not available he must use his ingenuity to protect the cargo without them. Unloading ships quickly and with the minimum loss of cargo by breakage and

pilferage is a problem frequently made more difficult by the antiquated equipment used in many ports, or the lack of dock facilities, shortage of labor, unfamiliarity of the stevedores with the items, unfavorable weather conditions, or cargo made inaccessible by shifting during the voyage. In many ports all over the world, unloading is carried on under fire, further complicating the operation.

Pilferage is the main problem met with in almost any port. The three types of cargo which most frequently appear on the "missing sheet" are food, clothing, and post exchange items. Sometimes food is eaten in the holds, clothing is worn off the ship, and post exchange items are slipped into the pockets of the newly-acquired clothing. It is important that the security officer be familiar with all of the refined methods of pilferage in order best to combat them. The security officer in dealing with pilferage must rely primarily upon tact and diplomacy to insure that the unloading of the ship will not be impaired.

Once the cargo is unloaded, the security officer must personally check each hold for overlooked cargo. He then prepares a handful of forms which relate to activities of the ship and its cargo, delivers these forms to the proper authorities, and then boards the ship for the return voyage. In many cases, this must all be done at top speed in order that the officer will be aboard the ship before sailing time. Wherever it is possible, the security officer returns on the same ship which brought him across, but all too frequently the ship is not scheduled to make the return trip directly but is redirected to proceed to some other port, with or without cargo. When this happens, the officer becomes a casual under the jurisdiction of the port commander who makes arrangements for a return voyage by transport or other ship, unless he finds it desirable to send the cargo security officer along with a cargo to some other port.

Subject to the port commander's wishes, the CSO's frequently find that the home voyage takes much longer than the usual run. Recently, two officers reported to the New York Port of Embarkation after serving on a Mediterranean "shuttle service" for over six months. The mechanism of the unofficial transfer to these "shuttle services" is as follows: the port commander will issue an order that the officer will proceed to some other port with another shipload of cargo; upon arrival at that port, the commanding officer there will issue a similar order.

Frequently, a ship will start to unload a portion of its cargo at a port and then be rerouted to another port to complete the discharge; at this second port, another change of orders might possibly result in the reloading of the partially loaded ship and the despatching of this ship to yet another port. The process has no end, and the security officer must remain with the ship until all of the army cargo has been discharged. Because they are roughly analogous to the pilots in the Air Transport Command's "Ferry Command," these "shuttle service" cargo security officers of the Transportation Corps were nicknamed "the Ferryboat Boys," a name which was eventually applied to the whole detachment.

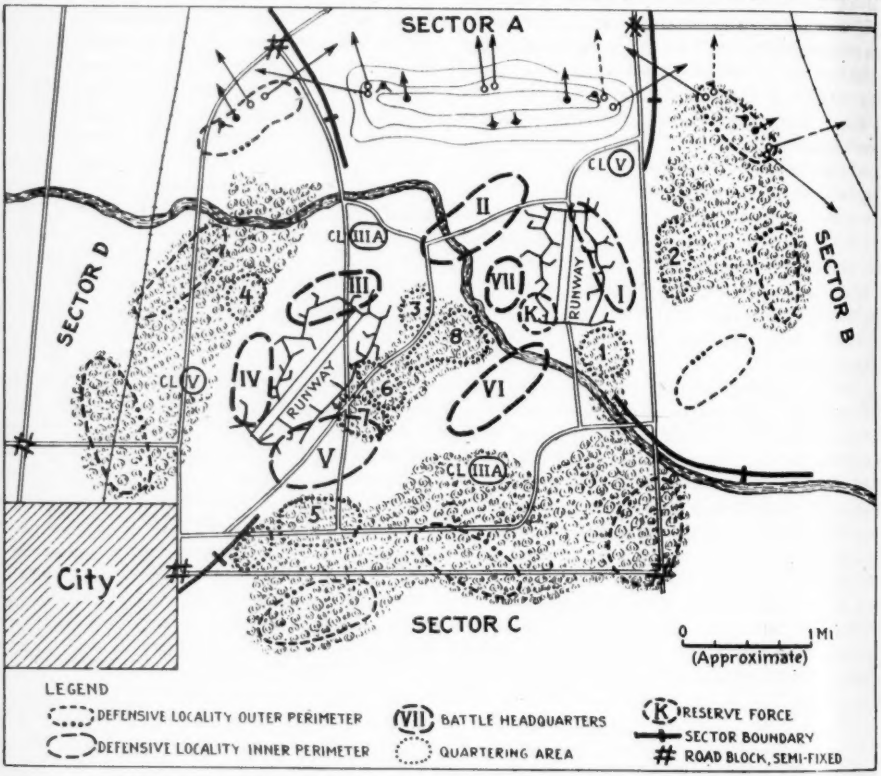
The modern day army is motorized and mechanized to the highest degree. Its striking power and mobility have been increased an unbelievable amount. But without proper maintenance a modern army is bogged down. The maintenance of motorized and mechanized equipment is so vital today that if not properly carried out, equipment becomes a liability instead of an asset. To keep this asset at its greatest value, preventive maintenance must be performed at all times. No equipment should be charged on the red side of the ledger—the red side being blood spilled needlessly because somebody didn't do his job when it should have been done.

—Maintenance Division, ASF

Airdrome Defense

LIEUTENANT COLONEL S. A. BAYNE, *Coast Artillery Corps*
Instructor, Command and General Staff School

THIS article is designed to bring out the many problems that must be considered in establishing the defense of an airdrome. The staff coordination required at the airdrome itself, that required with outside units, the troops to be used in the defense, and the responsibility of the various officers of the staff should be noted particularly.



First we must remember that the airdrome commander is responsible for everything that occurs at the airdrome. As the airdrome commander is normally the commanding officer of the tactical unit stationed on that airdrome, he is going to be very busy and will normally have available other officers who had more training and experience in defense than he has. He will normally designate one officer as airdrome defense officer and make him responsible for the formulation of a plan for the defense of the airdrome and for training and testing all units in carrying out the provisions of the plan. If infantry units are assigned to the airdrome to assist in its defense, the infantry commander may be designated. If the antiaircraft artillery commander is senior or if there is no infantry present, it may be the antiaircraft artillery commander. In the remote chance there is no antiaircraft artillery or infantry present, the commander of the aviation engineers has had training

in ground defense and may be so designated.

In preparing the defense plan, three things must be considered:

1. The enemy's capabilities.
2. The area to be defended.
3. The troops available for the defense and their state of training.

The enemy has a number of capabilities for attack that must be considered. From the standpoint of air attack, he may make strafing attacks combined with low-level bombing if fighter-bombers are used. Next, high-level pattern bombing of the area may precede this attack to damage the runways and try to knock out some of the antiaircraft positions. Dive bombing of particular points and low-level bombing of the runways must be considered. This latter is liable to be very expensive and is the least common type of attack.

Then airborne attack is a capability. This usually is preceded by strafing and bombing to reduce or knock out our defenses. If the enemy can reduce our defenses sufficiently, he may try to land on the airdrome. If not, he will try to use the nearest good dropping ground for parachutists and use our runways after they have heavily engaged or overrun our defenses. His third alternative is to find good ground for landing gliders as well as parachutists in the vicinity of the airdrome.

Defense against the enemy's capability of ground attack by a break-through or enveloping action of his armored units must be included in the plan. Defense against sabotage and chemical attacks are two more capabilities against which we must provide defense.

First we will consider the steps to be taken in determining the defense areas needed to provide *all-around defense*. Before anything can be decided there must be a thorough reconnaissance of the terrain in the vicinity of the airdrome. This should be made by the airdrome defense officer, the antiaircraft commander, and the aviation engineer if one is present. This reconnaissance should determine (1) the favorable routes of approach to the airdrome available to the enemy for ground operations, (2) favorable landing areas for airborne operations, and (3) available routes of approach for enemy aircraft. The enemy is going to search for the weakest part of our defensive setup. He will hunt for a route leading into our position which will give him cover and concealment. After this reconnaissance the airdrome defense officer can lay out his outer perimeter defensive localities and establish the necessary road blocks. The defensive localities selected must take advantage of all terrain features favorable for defense, such as high ground, wooded areas, and defiles. The road blocks to be installed should be placed at defiles such as cuts or bridges if these are present, and at a point where they can be covered by fire. In establishing our defensive localities we must remember that the ground not actually occupied by men and weapons must be covered by the fire of these weapons. Again, we must consider that each of our defensive localities must have all-around defense the same as the airdrome itself.

After provisions have been made for all-around defense of the airdrome, we must consider *sector defense*. This means that our outer perimeter defenses must be divided into sectors and the responsibility for that sector defense assigned to the senior officer with the troops in that sector. The sector responsibility should extend inward to the vicinity of the actual airstrips where the inner perimeter defense is established.

In any defense, if it is to be successful, there must be *defense in depth*. To achieve this there should be an inner perimeter defense for the close-in defense of the buildings, planes, runways, and supplies that are at the airdrome. This also constitutes the defense against airborne troops who may land on the field itself. This inner perimeter of defense should be a series of defensive localities just the same as those on the outer perimeter. Normally the entire inner defense is commanded by the airdrome defense officer and not divided into sectors.

To accomplish proper control of this defense there must be a battle headquarters.

This headquarters should be centrally located so that the defense commander can see the runways, buildings, and other installations from this point. Communications from all defensive localities must be run to the battle headquarters and necessary radio equipment provided for control of the entire defense in addition to wire lines laid.

In laying out our defensive localities and battle headquarters, the importance of *alternate* and *dummy positions* cannot be overemphasized. To defeat enemy efforts to determine our defensive setup by photo reconnaissance, we must be sure that our actual positions are well camouflaged and that dummy positions are established, camouflaged (not completely), and made to look as though they are used, to induce the enemy to plan his attack against a nonexistent defense. To reduce casualties it is essential that we have alternate positions. The preparation of these positions permits personnel to move to a previously prepared position if enemy artillery or mortar fire is brought to bear on the original position or if the enemy overruns forward positions and some elements must fall back. Against air attack, use of alternate positions permits the antiaircraft artillery units to vary the defense pattern and confuse enemy air units as to the actual position of the antiaircraft weapons defending the field.

Coordination of fire plans between the elements of the inner and outer defenses and between defensive localities in each line must be stressed. Failure to assign sectors of fire for each defensive locality under various conditions may result in our troops firing into each other, particularly when an airborne attack is made on the airdrome itself or when it is necessary for a defense force to fall back on another defense line.

In any defense there must be a reserve. In an airdrome defense it is best, if sufficient personnel is available, to have both a reserve and a mobile striking force. The duty of the mobile striking force is to go out and stop the enemy before he can reach the defenses around the airdrome. If infantry units are assigned to an airdrome defense they would normally be motorized and designated the mobile striking force. If no infantry is present, the aviation engineers have had the best training for this purpose. The reserve force at the airdrome proper would be used to bolster the defenses in any sector where the enemy is making his main effort.

After the defense plan is laid out we must assign the troops to man the defensive localities. To avoid confusion a system of lettering and numbering the defensive localities and the forces to man them must be adopted. For example, Force 1 (three officers and 100 enlisted men from 91st Fighter Squadron) will man defensive locality A. It must be remembered that *every individual* on the airdrome must have a job in the defense and know to which assembly point he will go when the alert is sounded. This means every man, including transients, who is not actually directed to take off in an aircraft or to stand by his plane for take-off instructions.

In making assignments to compose our defense forces, consideration must be given to the point where individuals are working and where they are quartered. Care should be taken in assigning quartering areas to place them as close as practicable to the point where the men will be working and then assign these groups to a defense force to man the nearest defensive locality.

Use must be made of all weapons available at the airdrome. All machine guns not mounted in aircraft should be used by the defense forces. The antiaircraft-gun positions must be tied in to the ground defense whenever it is possible to do so, and consideration must be given to the necessity for antiaircraft personnel to fall back on alternate positions within the defensive localities if a strong enemy force appears. The tremendous fire power of antiaircraft weapons against ground targets must be utilized to the maximum in the defense plan.

The importance of a good defense plan for an airdrome cannot be stressed to much. However, like all plans, the execution determines its effectiveness. This means that the state of training in ground defense of all units at the airdrome must be considered.

It will usually be found that additional training for many units will be required and a training program must be set up at once to bring the state of training to the required level without delay. This training program must include practice alerts involving all personnel as well as specialized training to correct deficiencies.

It must be remembered that the basic principles of defense must always be used:

Defense in depth.
Sector defense.
All-around defense.
Use of dummy and alternate positions.
Safety.
Adequate training.

Burma—"The Jungle Isn't Half Bad"

An article by Lieutenant Colonel D. E. Still in *The Cavalry Journal* November-December 1944.

IN SIX months of operations with "Merrill's Marauders" in Burma I have seen two snakes (garden variety), one scorpion, and that is all. Without even trying, anyone could do as well in one afternoon along the Texas border. At certain seasons of the year the jungle is a bit warm, but it is certainly not any hotter than Fort Clark in the summer, or for that matter, Fort Riley in August. There are, however, quite an assortment of trees, bushes, and vines. In fact, for the most part, on careful inspection, one finds that the Burma jungle is composed of that and little else. To this there is one important exception; there are trails, villages, and clearings.

These latter terrain features are all important. No one (not even the natives) does much fighting, carousing, or loitering in the jungles proper; that is, not for any extended period of time. Everyone travels on the trails, makes his living off the clearings, and lives in or near the villages. Likewise, most all of the fighting is on or near roads, trails, and villages. Of course, during the excitement of battle, and for tactical reasons too, a certain amount of fighting occurs in jungle terrain adjacent to trails and villages—but it is very adjacent.

Most writers on the jungle seem to fill up space with the unusual and rare features of jungle terrain and jungle fighting but fail to mention the commonplace and day-to-day usual items.

As far as fighting is concerned, the Burma jungle imposes limitations on the usable range of weapons, increases the relative importance of short-range automatic weapons, and increases the difficulties of observation for artillery and mortars. Maneuver is restricted, of course. Usually, troops move more slowly and for shorter distances. Obviously, negative air information must be closely checked.

He who controls the trails, towns, and watercourses controls all the rest of the local scenery. If the Japs prefer to forsake these and go in the jungle, don't become impatient. They will get disgusted and hungry enough to come out. If they stay in the Burma jungle long enough, and in sizable numbers, the Emperor will probably be forced to form another new cabinet.

As for living off the Burma jungle, forget it. Stick to K or C rations, however monotonous. If bad becomes worse, bum some chow off the natives. If lost, and unable to find your way around, blame yourself for not learning basic scouting and patrolling, which is as applicable in Burma as in Kansas or Texas. Then, after this period of self-recrimination, swallow your pride and ask directions of a native as you would of a San Antonio traffic cop or a local farmer in Louisiana.

Seriously, all that one has to do to survive the jungles of Burma is to be sensible, adhere to basic principles, and snuggle up close to your own artillery and air support. If you do this, you will find that the jungle isn't half bad.

Notes From Battle Experiences in the Pacific Theater

This is a digest of an observer's summary of battle information gained by the experiences of a cavalry division operating in the Pacific Theater.—THE EDITOR.

CAVALRY-ARTILLERY COORDINATION.—An artillery liaison officer was detailed to and was with each rifle troop on the front line. These officers rendered most valuable assistance in getting artillery support when and where it was needed. Wire communication was maintained between units being supported and supporting units regardless of size. Very close coordination was maintained between division headquarters and division artillery headquarters.

WEAPONS.—The 81-mm mortar and the BAR proved to be the most popular weapons.

MORALE.—Morale was high all the way through. *Even the toughest going failed to break it.* This division believes in itself and *goes in to win* regardless of consequences.

COMMUNICATION.—The *runner or motor messenger* proved to be the *most reliable.* Due to excessive rains, telephone lines went out many times. However, the telephone proved to be very efficient even under those adverse conditions.

The radio was in and out. Sometimes it worked nicely—at others it was useless. The SCR-300 proved itself to be very useful. The field artillery SCR-608 frequency modulated set is a very efficient set so long as it is not interfered with by hills or other obstructions.

Teletype and telegraph were highly efficient.

TANKS.—*Tanks were used but little.* The terrain in general was highly unsuited for them. It was either a swamp or a mountainous area . . . Medium tanks appeared to be able to go any place that a light tank can and seem to be far more effective.

METHODS OF COMBAT.—The division followed the book. Methods outlined in training manuals and field service regulations were found to be sound. It is true that these methods must be applied practically. The expression, "Throw the book away," did not apply in this operation. Simple, carefully thought out plans worked, and brought highly satisfactory results.

JUNGLE SUPPLY METHODS.—The division must be trained and ready to use ground, water, and air facilities for supply.

The supply problem was very acute. Roads were scarce, traffic demands were tremendous, and many times troops were miles from any road. Water supply by amphibious truck, LVT, and LCM . . . facilitated this matter very much. Air drop made it possible to get supplies to troops which were so isolated that all other means including native carrier were inadequate. Air-ground coordination in this method of supply was very difficult. The jungle is so thick that the use of panels cannot be considered. Smoke is uncertain. Map coordinates are so unreliable that they are worthless. The only method which brought satisfactory results was to fly an observer, who knew where the troops were, over the troops in the field artillery liaison plane. After seeing what the terrain looked like from the air and picking out a spot to make his drop, put this same observer in the plane which is to make the air drop. He can then direct the crew of the air-drop plane. Native carriers were employed where necessary. They were most helpful. In general, the supply of rations, ammunition, clothing, medical supplies, and gas and oil were adequate. K and C rations were used almost exclusively. They were satisfactory . . . By careful conservation, the division artillery was able to give field artillery support when and where needed . . . Curtailment of ammunition supply continued throughout . . . the operation. The supply of spare parts for motor vehicles was reasonably good. Vehicles were kept running. Poor roads, constant rains, and the resultant mud made the operation, maintenance, and upkeep of motor vehicles a very difficult problem. Wear and tear on these vehicles were so great that nearly all will have to be replaced in the very near future.

TRAINING.—For an operation of this nature, physical conditioning and hardening

are the most essential factors. Unless troops are in the best physical condition and able to withstand hours on hours of the most rigorous marching and climbing, they are useless. Strength and endurance are taxed to the maximum. Troops of the division stood up well in this operation which was conclusive proof that they were prepared for it.

Next in importance comes scouting and patrolling . . . The successful accomplishment of the division's many missions was made possible by excellent training in this work.

Combat is largely confined to small units, troops and platoons. Therefore training in combat of small units must be thorough and complete. The division proved itself to be highly efficient in this matter.

All officers and men must be thoroughly grounded in technique of weapons. Reduction of stoppages and stripping and assembling of the various weapons must be so thoroughly understood that they are accomplished without thought. Likewise, selection and occupation of position must be understood by all. Division training in these functions was thorough and complete.

Troops, squadrons, and regiments must be indoctrinated in overhead fire. When artillery and mortar support is being given, front-line elements must keep as close behind the area on which fire is being placed as is possible. Only in this way can success be obtained. This training had been emphasized in the division and excellent results obtained.

Guerrilla Warfare in Burma

From a British source.

Not so long ago, the Nagas, mountain tribes, were headhunters; they are now stout allies of Britain and Burma. When the Japanese occupied the country they tried very hard to win the Nagas over, because their services as interpreters, government officials, and policemen would have been invaluable. But the hillmen are fierce patriots and the enemy efforts met with no success.

Intelligence work is the Nagas' specialty. They work right among the Japs and gather priceless information for the British Staff. Many of our air strikes were based directly on information brought by the Nagas. And besides giving such valuable intelligence to the Indian Army, they have also fooled the Japs by giving them false information. They have frequently harbored Jap deserters and guided them into our lines, and have aided our prisoners escaping from enemy custody; and their cooperation has been an important factor in preventing the infiltration of Jap agents into India.

Villages which have been in enemy hands for as long as three months have still maintained resistance, kept contact with British troops, and when possible have sent runners with information. They have brought in many wounded British soldiers and airmen on improvised bamboo stretchers for miles through Japanese-held areas, sometimes fighting off enemy patrols to get these men through.

Equally stout allies are the men of the Chin Hills. Recently the Chins have developed a system of armed levies which makes every villager a guerrilla fighter.

There is also a group of tribes in the Kachin Hills who have developed a guerrilla organization similar to the Chins. Their levies constitute the biggest of the hill forces. One unit of them, known as "The American Kachin Rangers," protected the American left flank on the Fort Hertz-Myitkyina road. The northern Kachin levies are under British command.

Another more or less guerrilla group is the Lushai Brigade. The Lushais and Chins have been traditional enemies for centuries but are now united like brothers against their common enemy, the Japanese.

The AAF Goes to Sea

LIEUTENANT COLONEL JACK R. MILLER, *Air Corps*
Instructor, Command and General Staff School

DURING the early stages of the first island campaigns in the Southwest Pacific, many of our planes based on newly-developed air strips were non-operational. Contrary to popular belief, few of these were badly damaged. Most of them merely awaited repairs to vital parts and accessories, such as altimeters, fuel pumps, magnetos, carburetors, and radios. Indeed, ground crews performed exceptionally with their limited specialists and hand tools. It became apparent, however, that maximum air striking power could not be attained without the aid of repair shops which, with their more skilled technicians and infinitely more efficient heavy equipment, could accomplish the majority of these repairs within a few hours.

The only mobile shops then available to the air forces were mounted in trucks and trailers. Shipping these units from shore to shore during the early stages of an island invasion was difficult. Moving them from beach to air strip, over roads that were little more than trails, proved impracticable. By the time it was feasible to bring them in, there was an overburdening backlog of work orders. Thus arose the military requirement for floating shops for the repair of parts and accessories of army airplanes.

Appropriately termed the "Ivory Soap" Project," development of these shops and training of operating personnel were delegated by Headquarters Army Air Forces to the Air Technical Service Command. Two classes of floating shops were required; one for third echelon repair, corresponding to that performed by the truck and trailer-mounted shops; the other for fourth echelon repair, corresponding to that furnished by air depot shops. Small, twin-screw, Diesel-powered vessels were built to meet AAF requirements for the former; while several Liberty ships were modified to meet AAF specifications for the latter. AAF personnel were trained to operate the shops and related activities, provide their own mess and administration, and man the several antiaircraft guns. Merchant Marine crews, however, operate the vessels.

Known as the Aircraft Repair Unit (Floating), the fourth echelon repair organization comprises approximately four hundred officers and men. These are, of course, in addition to the Merchant Marine crew. The organization is capable of serving several air force combat groups, the number naturally varying with the work load resulting from operations. It is equipped with ducks for ship-to-ship and ship-to-shore transportation; also, with two helicopters, which operate from an ample flight deck provided on each converted Liberty ship. The helicopters, which may be equipped with pontoons when required, are for use in expediting delivery of small parts and accessories to the vessel for repair, and for picking up urgently needed small items from established air force depots. Each ARU (Aircraft Repair Unit) has an organic flight section, consisting of two pilots and four mechanics, for operation of these planes.

Personnel for the various shops (propeller, sheet metal, woodworking, electrical, instrument and camera repair, machine, welding, armament, fabric and paint, battery repair, rubber repair, plating, radio and radar) are reinforced by specialists in technical supply and administration. An oxygen manufacturing shop is designed to supply combat units with breathing oxygen for high-altitude operations and for oxygen therapy. In general it may be said that machinery and equipment compare favorably to facilities provided by the average air base in the United States.

The third echelon organization is named the Aircraft Maintenance Unit (Floating). Numbering approximately fifty officers and men, the AMU is similar to its fourth echelon counterpart. However, personnel and equipment are on a considerably smaller scale, and there is no oxygen manufacturing shop. Equipped with ducks and a small work boat for transportation to and from shore, it is designed to serve one combat group.

CONCEPT OF TACTICAL EMPLOYMENT OF AIRCRAFT REPAIR UNITS (FLOATING) AND AIRCRAFT MAINTENANCE UNITS (FLOATING)

SCHEMATIC DIAGRAM ONLY

LEGEND

ARU	Aircraft repair unit	AMU	Aircraft maintenance unit
....	4th echelon maintenance & repair service	Sv Cen	Service Center
....	3d echelon maintenance & repair service	Gen Dep	General Depot

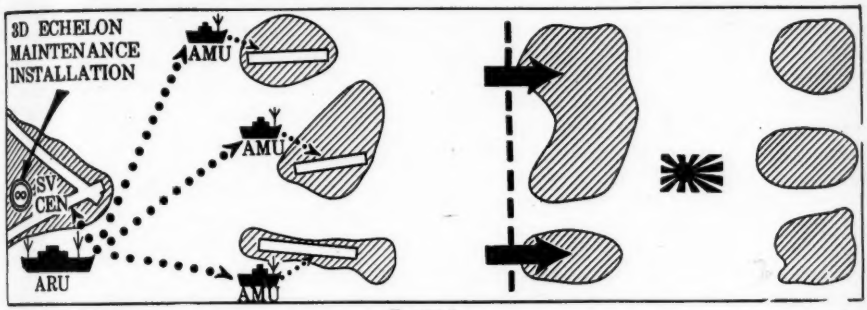


FIGURE 1.

AMU'S SERVE AIRPLANE UNITS LOCATED AT NEW AIR STRIPS ON ISLANDS RECENTLY SEIZED FROM THE ENEMY. THIRD ECHELON INSTALLATIONS NOT YET ESTABLISHED AT STRIPS. ARU SERVES AMU'S AND ALSO 3D ECHELON INSTALLATION (SERVICE CENTER) LOCATED ON MAINLAND.

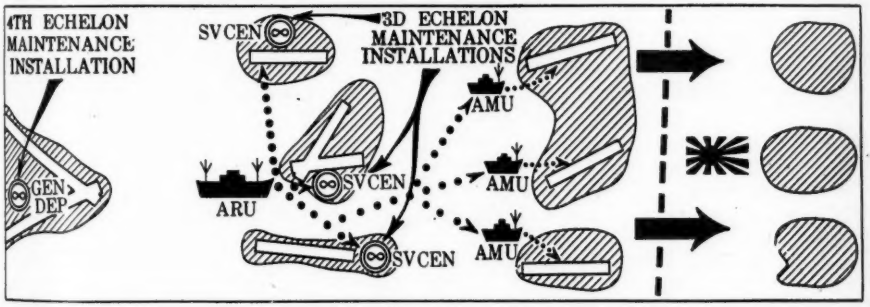


FIGURE 2.

MORE ISLANDS HAVE BEEN SEIZED AND NEW AIR STRIPS DEVELOPED. AMU'S MOVE FORWARD IN SUPPORT OF AIRPLANE UNITS. AIR STRIPS FORMERLY SERVED HAVE BECOME BASES, WITH 3D ECHELON INSTALLATIONS. ARU MOVES FORWARD TO SERVE 3D ECHELON INSTALLATIONS AND TO CONTINUE TO SERVE AMU'S. A 4TH ECHELON INSTALLATION (AIR FORCE GENERAL DEPOT) HAS BEEN ESTABLISHED ON THE MAINLAND, BUT IT IS NOT YET PRACTICABLE FOR IT TO SERVE ISLAND-BASED 3D ECHELON INSTALLATIONS.

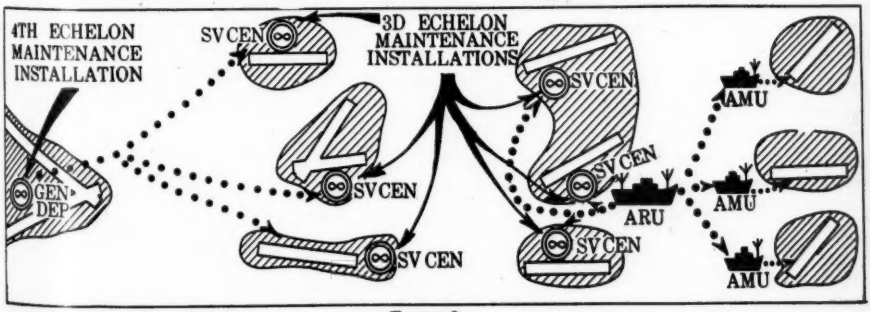


FIGURE 3.

WITH FURTHER ADVANCES, THE PROCESS IS REPEATED. HOWEVER, THE 4TH ECHELON INSTALLATION IS NOW ABLE TO SERVE SOME ADVANCE 3D ECHELON INSTALLATIONS.

Reparable parts and accessories will be evacuated from air strips to the vessel and, in turn, passed on to one of the ARU's when fourth echelon repairs are required. Plans also call for repair crews to go to shore and, when practicable, perform on-the-spot third echelon repairs to complete aircraft, thus avoiding disassembly for shipment to air force depots. The capability of these smaller vessels for salvaging operations should be obvious, and it is expected that such activities will consume much of their time, particularly when the work load from combat operations temporarily slackens.

A floating repair shop is by no means a new concept. For a long time, naval aircraft repair ships (for land-based Navy planes), aircraft carriers, and seaplane tenders have furnished third and some fourth echelon repair service. Various other repair vessels are used by the Navy—some, for example, to recondition small landing craft and their Diesel power plants. Recently the War Department authorized Ordnance Floating Maintenance Barges for assignment to theaters to augment medium and heavy maintenance facilities for Ordnance equipment as required by island warfare.

The point to be made, however, is that the ARU's and AMU's represent a pioneer development in the Army Air Forces. Their tactical employment is, therefore, as yet undetermined and will remain so until the theater commanders have had sufficient opportunity to use them in various situations. Such was the case of the Air Service Groups, whose employment today is considerably, if not fundamentally, different from their original use in 1942.

Knowledge of the capabilities of the ARU's and AMU's allows a "reasonable conjecture" concerning their employment, such as is outlined on the accompanying diagram. Moreover, it permits the certain conclusions that these units, by filling the gap in Army Air Force maintenance, will enable us to strike with maximum air power.

The Road Back

From *Air Force* March 1945.

THE Japanese philosophy by which the individual is canceled out for the sake of the State has been illustrated often enough in combat. No official Japanese statement has given more solemn expression of this attitude toward war than a training directive which includes instructions to soldiers taken prisoner:

For unwounded personnel, the only alternatives are death or escape. Before dying, the Nipponese fighter is expected to strike a blow against the enemy. He is warned especially that kind treatment by captors and anti-war doctrines are subversive to his honor.

For the prisoner who escapes, the future is grim. He is directed to collect as much information about the enemy as possible and report to his superior officers. After return to his ranks, the ex-PW must "realize his misdeed, show penitence, make a full statement, and await the decision of his superiors." He still has a chance to "wipe out the humiliation and cleanse his disgrace by death in combat" if he is an enlisted man; if he is an officer, the recommended course is suicide.

The directive leaves no room for compromise: "Although there are sympathetic feelings towards persons who have fallen into enemy hands due to severe wounds, no matter what the excuse may be, it is the utmost disgrace to be captured alive."

The Chaplain and Stimulation of the Will to Work

CHAPLAIN CONSTANTINE E. ZIELINSKI, *(Lieutenant Colonel) USA*
Deputy Air Chaplain

THE chaplain's position in the Army is unique. This uniqueness stems from the fact that, although he is a commissioned officer, he remains primarily a clergyman.

As a commissioned officer, the chaplain has ready access to those in command. As a clergyman, the enlisted men have ready access to him. Thus, a chaplain spans the bridge between officers and men and, in a sense, takes off the rough edges of military segregation which is necessary for the sake of the maintenance of military discipline. In the person of the chaplain, and in his person alone, do we find this unique character of function.

Now this fact has a great deal of significance for anyone interested in personnel management, as this relationship between the chaplain and the entire military family, commissioned and non-commissioned as well, constitutes the very foundation of an effective source of will stimulation.

Mechanical defects or lack of fuel alone render machines non-productive. Men, unlike machines, need more than health, sleep, and food. They have free wills by which they operate and thus produce. This will power follows the emotions and the intellect for a lead. If the intellect stalls or the emotions run wild, the will follows the tumult and the human machine fails.

Any person who reaches the will through teaching the balanced use of the emotions and through sound indoctrination of the intellect, any such person is in an important position. When that person has ready access to human beings, and they to him—as in the case of the chaplain—such a person is in a position of tremendous importance and value.

On one side of the ledger we find the spiritual aspects of the chaplain's work directed towards persuading men to will right things. Self-control is taught. Sound thinking, too! This self-control and sound thinking are taught on the basis of the highest type of motivation, namely, the authority of Almighty God. This creation of a sense of duty in men on the part of a chaplain is the sum and substance of his contribution to the stimulation of the will to work.

On the other side of the ledger we find a slightly different contribution by the chaplain to the will to work. This activity of the chaplain centers about factual breakdowns in the will to work—breakdowns which have already taken place.

The broad scope of this work covers disciplinary cases, welfare and family problems, readjustment factors, and other allied activities. In most of these instances the chaplain pieces together broken parts of lives and seeks a solution as to the cause of these breakdowns in individual cases in order to prevent their recurrence. He levels off emotional excesses which, if permitted to run wild, would kill off sound reasoning and run away with the will.

The nature of this work is confidential for the greater part. It takes place behind closed doors. Nonetheless it is real work of a very constructive nature. Emotional upsets and mental stress either wreck a human being or destroy his efficiency to a marked degree. Through the assistance he gives in relieving this distress which destroys the will to work, the chaplain automatically establishes himself as an instrument of productivity. His work by its intrinsic nature stimulates the will to work.

The effectiveness and importance of this work on the part of the chaplain in a domain of the will to work is belittled only by that type of individual who is oblivious to the fact that loneliness, mental distress, fear, and warped reasoning incapacitate human beings just as much as enemy bullets. Generally speaking, such individuals are blinded by their own state of well-being and, always thinking of themselves, cannot grasp the fact that others, less fortunate, suffer pangs of human misery which incapacitate to a remarkable degree.

The dictates of sound personnel management demand a full degree of appreciation of the role of the chaplain. Personnel management deals with individuals endowed with free wills, not with automatons. Accordingly, every Director of Personnel who is worthy of the name must constantly keep his eyes on the scales of human conduct. It is the human will that tips the scales one way or another—for good or for bad. On a hard-headed production basis this means either more goods and service or less. The chaplain is an essential cog in the weighing of the result. He should be utilized at all times with full appreciation of that fact. His spiritual and morale work are sources of real production.

Blast

From a British source.

In open country a man was within fifty feet of an exploding 2,000-pound bomb. He was thrown to the ground but escaped serious injury. One observer saw the effect of a flying bomb that exploded in a field. All it did was kill two sheep that were within twenty feet of the crater. There were a hundred or more in the field. The others were unharmed.

Blast is pressure on air caused by an explosion. In the open countryside this tremendous pressure behaves in normal fashion. It spreads upward and outward, traveling at first up to 4,000 and 5,000 feet per second but losing speed rapidly to 1,100 feet per second, which is about the rate of sound.

With no obstacles in the way, blast disperses evenly around the center of the explosion. And there is a positive as well as a negative impulse—that is, first an outward and then an inward blast due to suction.

In built-up areas the effect is very different. The blast has to disperse, and when there are innumerable obstacles, such as buildings, the blast takes the line of least resistance. It rushes down streets, into doorways, or through any hole it can find. Then the negative impulse, or suction, results, and this behaves in much the same fashion as the outward blast, finding holes to rush through. This is the reason why you find windows near the explosion blown inwards and those some distance away blown outwards.

In open country the effect of the blast is like tossing a pebble into the water; you see ripples—pronounced near the center and fainter on the outside. In built-up areas it is more like a stream flowing under a bridge which has several pillars or piles. Water displaced by the pillars crowds the main stream with the result that there is a much faster flow under the bridge and just below it until the stream resumes its normal course.

For this reason people are advised to remember that corridors, doorways, and passages, or any place where it is obvious that the blast will be more concentrated, are not good places for shelter from blast.

Yet blast has surprisingly little effect on the human body. There is, of course, danger to the ear-drums, and if a person is near enough to the explosion his lungs may be seriously, even fatally, affected. But in the main, the human body will withstand a tremendous blast, though there is danger of a blast picking a person up bodily and hurling him a considerable distance.

For that reason, it is advisable to lie down, but it must not be forgotton that when lying prone you offer a bigger target for falling missiles. Things that may hit you are the danger—not the blast itself. An upper room, with no glass danger, is safer than a ground floor room that has a lot of glass, crockery, or other possible missiles. Things will be blown off the wall, off shelves, even out of cupboards. Generally they will fly horizontally, so if you are out of the line of flight you should be safe.

MILITARY NOTES AROUND THE WORLD

JAPAN

"Irving":

Under the Japanese Navy system of aircraft designation, the two operational versions of the airplane known to the Allies as "Irving" are described as Type 2 Land Reconnaissance Model 11 (J1N1) and "Gekko" ("Moonbeam") Night Fighter Model 11 (J1N1-S).

The J1N1 reconnaissance version of "Irving" carries a crew of two—pilot and radio operator/photographer, both of whom also have the additional role of gun-firer. The armament consists of a fixed nose battery of one 20-mm cannon and two 7.7-mm machine guns fired by the pilot, and two tandem dorsal turret mountings each with a pair of 7.7-mm machine guns. Two vertical cameras are located amidships.

The later and more important night fighter version (J1N1-S), which went into production in 1943, has a more powerful cannon armament. The standard arrangement appears to consist of four 20-mm cannon mounted in pairs, one pair above and one below the fuselage amidships. The upper pair fires upward at an angle of thirty degrees and the lower pair at the same angle downward.

In addition to the above, some "Irvings" are fitted with an additional 20-mm or 30-mm cannon in the nose and firing directly forward. There is also evidence that three cannon may be installed amidships to fire upward. Other equipment of the J1N1-S night fighter includes flame-damped exhaust pipes, full radio, including D/F homing equipment, automatic pilot, and radar.

Irving presents something of a paradox as an operational type. Born a fighter in peace and put into production as a reconnaissance type in war, it now seems to have been pressed into the Japanese equivalent of the Volkssturm purely as a defensive instrument in anticipation of the coming onslaught on the Japanese mainland by day and night.

Notable recognition features which can be seen in the illustration are the double-step cockpit arrangement, the thin untapered rear fuselage, and the distinctive fin and rudder.

(*Aircraft Recognition*, Great Britain)

Types of Lewis Gun Used by Japs:

It may come as something of a surprise to old timers to learn that the Lewis machine gun they found so valuable in World War I is today an official Japanese service weapon.

The weapon is so distinctive in appearance that it can never be confused with any other LMG. The flat rotating pan on top of the receiver and the long "stovepipe" cooling jacket and flash hider over the barrel immediately identify it.

Lewis guns as used by the Japs for ground guns fall into three classes. First, the Japanese *copy*. In practically all details except the mount, this weapon is a replica of the standard British Lewis Mark I; and it uses the standard British Mark VII caliber .303 cartridge or an exact copy of that cartridge manufactured in Japan.

Second, Lewis Mark I guns captured from the British. These are usually found as issued—with folding tripod mount. However, these also may be found mounted on special Japanese tripods for defense use. These will use either the regular British .303 or its Jap equivalent, of course.

Third, Lewis guns purchased from Great Britain or from German arms cartels—notably Georg Frank of Hamburg—in the 1930's. These are rebuilt guns, some of which we sold to Great Britain during World War I and which they disposed of when they adopted the Bren gun.

(*Marine Corps Gazette*)

New Jap Ramming Plane:

In addition to the "Raiden," the "Toryu," and the "Gekko," the Kamikaze Home Defense fighter units are being equipped with a new ramming airplane, the "Hie Ang" (Flying Swallow). This new airplane is described by the Domei News Agency as "perfectly streamlined and streaking through the air as swift and smooth as its namesake." The "Hie Ang" is said to be so strongly built that it hardly suffers at all from ramming attacks on B-29's.

(*The Aeroplane*, Great Britain)

Japanese Airplane Armament:

A powered gun turret and powered gun mount developed by the Japanese have been reported from the Pacific. The turret generally carries a 20-mm cannon, but it may also be fitted with the 12.7 and 13-mm machine gun. The gun mount carries either 7.7 or 7.9 machine guns. Both turret and gun are operated hydraulically. The single-hand lever turret control usually requires the operator to be at or near the installation, although in some planes—the Irving, for example—the mount is remotely controlled.

(*Air Force*)

GERMANY

Phantom City:

One of Germany's "phantom cities," constructed to fool night bombers into dropping their loads outside the Ruhr valley, was one of the first real war secrets uncovered by Allied armies driving across the Rhine.

Constructed probably around 1942, the phantom city lies in the heart of a wooded area near Gladbeck. It is an odd looking series of contraptions and apparently much work and thought went into it. First, there are high posts with boards across their tops and shaded lights casting beams downward. Apparently, from the air at night row after row of these gave the illusion of many houses or a big factory.

Next in the phantom city is a series of chimneys. These are about ten feet high, quite large and made of wood. From the air they must look as though they are sticking out of a camouflaged building instead of the ground.

Then there is a series of plain wooden roofs spread along the ground to give the illusion of rows of buildings. Each roof is rigged with a shaded light to outline it at night. There also are smoke pots and places in which quick fires could be built to make it seem that these "buildings" were burning.

Huts and dugouts were built for the men who kept the "phantom city" in repair. The complete layout is inside the Ruhr antiaircraft defenses but some distance from the vital targets of Homborn, Gladbeck, and Duisburg.

(From a news report)

Messerschmitt Me 262:

The first flying photograph of the Messerschmitt Me 262 reaction-propelled single-seat fighter. Two Junkers Jumo 004 gas-turbines supply the motive power for this airplane and are clearly visible in the view. Underslung,

these gas-turbines extend well behind the trailing edge of the low wing. This photograph was taken by the pilot of a North American P-51 Mustang of the U.S. Army Eighth Air Force who was among the escorting fighters of a bomber force attacking oil targets in Germany.

(*The Aeroplane*, Great Britain)

German Jets:

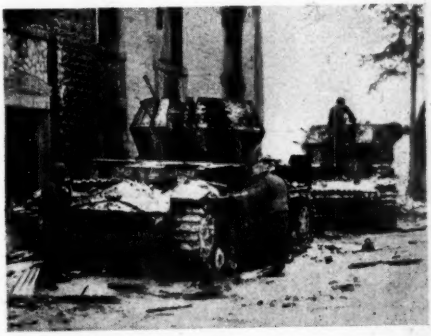
One or two interesting facts stand out from the enemy's use of the jet fighters. Despite their speed they are often not difficult to detect some way off because of the long vapor trail they tend to leave behind them—"contrail" it has come to be called in the ungrammatical wartime telescoping of words which has already added such descriptive but unedifying terms to the language as "airfield," "drop-tank," "paratroop," and "contrail."

Although normally a jet-propelled airplane achieves its greatest performance high up—there are exceptions—the Me 262 has been pressed into service as a fighter-bomber. Two bombs of 250 kilograms (551 pounds) each are slung under the fuselage. They spoil the exceptionally clean lines of the airplane and, combined with the low height, make necessary escort by conventional fighters in an effort to prevent "jumping" by Allied types.

So far, the Me 262 has been flown in an Agag manner—delicately. That may be because of unfamiliarity of the pilots with the machine or because of some structural weakness not yet modified out. In any case, such a state of affairs is not likely to last. There is no fundamental reason why a high-speed jet type should not be "aerobatted" within reasonable limits by experienced pilots able to withstand a fair amount of "G." The Mosquito can be thrown about in an abandoned manner—and it is not so very much slower than the new Messerschmitts.

(*Aircraft Recognition*, Great Britain)

German "Flak Wagons":



The vehicles shown here were used as mobile antiaircraft weapons during von Rundstedt's drive into the Ardennes. Mounted on a tank chassis, a revolving turret accommodates four machine guns used as antiaircraft weapons. The turret is armored, and the guns fire in pairs.

(*The Sphere*, Great Britain)

Nazi Mosquito:

The Germans have a counterpart of the British Mosquito. It is the FW-154, constructed of wood except for light alloy control surfaces. The plane has two engines and carries a crew of two, sitting side by side. It has two 132-gallon wing tanks and a 264-gallon fuselage tank. Armament includes 20-mm and 30-mm cannon and rocket tubes beneath the wings.

(*Air Force*)

GREAT BRITAIN

Steel "Shoes" for Tank Tracks:

To give a better grip on soft, muddy ground, the tracks of British tanks are being widened by adding a steel shoe to each link. With the

shoes, the track has an additional width of six inches. This enables the tanks to negotiate ground that previously bogged them. The picture above shows a British soldier fitting the shoes.

(The Illustrated London News)

Eleven-Ton Bomb:

The new 22,000-pound bomb, weighing eleven American short tons or ten long tons, is twenty-five feet five inches in length with a diameter of three feet ten inches, and is packed with a powerful high explosive charge. It is 10,000 pounds heavier than the high explosive bomb which sank the German battleship *Tirpitz* and penetrated fifteen-foot thick concrete roofs erected over Nazi U-boat pens. Its increased velocity should greatly exceed the devastation of any bomb so far employed against the enemy.

The primary role of the super-bomb, which is "from the family of large deep-penetration types," is for attacks on underground structures such as factories the Germans have built deep within the earth.

Although the bomb itself and also the aircraft which carry it are 100 percent British, the United States has given valuable assistance with production, the British Air Ministry says. "We already are obtaining supplies of complete bomb-bodies from America. It was schemed that the new bomb could be carried by the Lancaster which was chosen as the vehicle for delivering the goods to Germany."

The ministry has disclosed that the big Lancaster planes, which normally carry about six American tons of bombs, have been modified in order to carry the new missile. A crew of six is needed to load the bomb into the Lancaster in a half-hour operation.

(From a news report)

DR Compass:

An ingenious British compass which has made an important contribution to the bomber offensive has been removed from the secret list. Known as the distant reading (DR) compass, it was designed by the Royal Aircraft Establishment at Farnborough.

One limitation of the ordinary magnetic compass for war purposes is that it gives the desired information only when the airplane is flying on a straight and level course, and a bomber flying in this way over enemy territory is very vulnerable to flak and enemy fighters. Another disadvantage of the magnetic compass is that it must be located in the pilot's cockpit, where it is subject to interference by metal objects and electrical circuits.

The DR compass overcomes these difficulties and others; it continues to work accurately under conditions when the older type cannot be relied upon. It can also operate instruments automatically and correct the difference between true and magnetic north, informing the pilot, navigator, and bomb-aimer of the course of the aircraft. The DR compass is not affected by the vibration of firing guns and of violent variations in speed, and it can function in high latitudes where the normal compass is unreliable.

One unit combines a gyroscopic direction indicator and a magnetic compass, each exercising a disciplinary check upon the other. The master unit is normally carried in the tail of the airplane, away from magnetic dis-

turbances. The indications of the compass are transmitted to repeaters which can be placed anywhere in the aircraft. The pilot is able to steer a visual course by aligning the pointer and grid lines on the face of the repeater and then keeping the pointer and grid lines parallel.

The directional indications provided by the DR compass have sufficient power to work a number of instruments in the airplane, including the Mark XIV bomb sight which requires automatic orientation.

(The Times Weekly Edition, London*)*

U. S. S. R.

The Russian Navy:

The former USS *Milwaukee* and an unstated number of former United States torpedo boats, submarine chasers, and minesweepers are now part of the Red Banner Fleet. The USS *Milwaukee* has been renamed the *Murmansk* and is said to be the fastest war vessel in the Russian Navy, having a speed of thirty-five knots. She has been rebuilt by the Soviets and is now armed with twelve six-inch guns and sixty others of various types. She also carries four aircraft and two torpedo tubes.

Also in the Russian Navy is the former British battleship *Royal Sovereign,* renamed the *Archangelsk,* listed as 29,150 tons, with a speed of twenty-two knots, and carrying fifty-six guns of which eight are 14-inch. The British also furnished a number of 1,060-ton destroyers, since designated as the Derskii class. Also from the British are a number of submarines of Type B, displacing 540 tons.

In addition, the Russian Navy has two other types of battleships, the October Revolution class of 23,600 tons and the Sevastopol class of 26,690 tons.

Four cruiser classes are in the Red Fleet: the Kiroff class, 8,600 tons; the Red Caucasus class, 8,000 tons; the Red Crimea class, 6,934 tons; and the Commintern class of 6,338 tons.

(Army and Navy Journal)

UNITED STATES

Pneumatic Pants for Fighter Pilots:

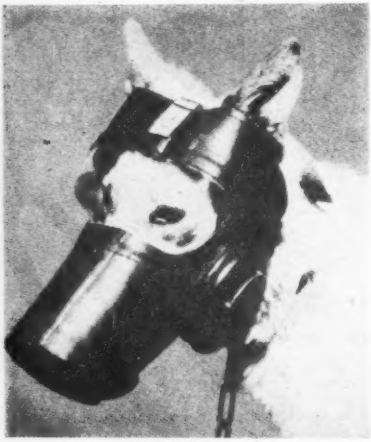
The War Department has announced that fighter pilots of the Eighth and Ninth Air Forces now are equipped with pneumatic pants which prevent them from "blacking

out" in maneuvers against the enemy. This equipment, known as the G-suit, applies pressure to the pilot's legs and abdomen during a pull-out or turn, thus preventing the blood from pooling in the lower extremities and enabling the pilot to make tighter turns in level flight and sharper pull-outs from power dives. The G-suit combats the effects of forces many times the gravity on the body, against which the heart is unable to pump sufficient blood to the brain. Airmen had learned by experience that shouting and crouching tensed their muscles and helped to raise their gravity tolerance by restricting the downward flow of blood, but these methods also prevented the pilot from seeing through his windshield, from watching from behind and above for the enemy, and from sighting his guns during the turn or pull-out. With the G-suit, fighter pilots are unable to black out and suffer much

less fatigue following combat maneuvers. This equipment, which resembles tight, high-waisted pants, supplies pressure over the abdomen and legs by means of bladders inflated by compressed air. Only two seconds are required to inflate or deflate the bladders by means of an automatic valve when the force of gravity rises above or falls below 2-G. All the pilot has to do is zip on the suit and plug it into the air line before taking off.

(*Bulletin of the U.S. Army Medical Department.* U.S. Army Air Forces photo)

Gas Masks for Dogs:



The Technical Command of the Chemical Warfare Service at the Edgewood Arsenal has designed the Mask, gas, dog, M6-12-8 which is suitable for almost all fighting pooches.

The mask weighs 2.10 pounds. Like a soldier's gas mask, it is designed to be worn when necessary, but not constantly. Tests show that some dogs can operate successfully while masked. Well-trained scout dogs can smell the foe through their masks, and masked messengers can find their way by their own system of "orientation."

The mask affords protection against chlorine, phosgene, and other choking gases. No body protection is given against blister gases on the theory that the dog's handler will carry the animal through contaminated areas. Made in one size, the mask will fit ninety-seven percent of all war dogs.

(*Quartermaster Training Service Journal*)

Greater Fire Power for M4 Medium Tank:

This General Sherman M4 medium tank is armed with the powerful new 76-mm gun known as the "Hole Puncher" which fires a 15-pound projectile at high muzzle velocity.

(*Army Ordnance*)

Frangible Bullets:

Not all of our weapons end up in actual combat. Recently our engineers were asked to design a bullet which could be fired at our own men. What was wanted was ammunition which, in training, could be fired at a lightly armored plane without injuring the crew. In use, the ship would fly evasively while attacking fighters would fire these "safe" bullets at it. It took time to evolve and produce a plastic .30-caliber bullet which was frangible—that is, would break up upon contact with the target without penetrating it and which could be used on armor as light as ⅛-inch dural plate. It is now in the final development stage and will very shortly be incorporated into our entire flexible gunnery program. The aerial gunners who are already using frangible bullets are learning to shoot far more accurately.

(Second Report of Commanding General, Army Air Forces, to the Secretary of War, 27 February 1945)

FOREIGN MILITARY DIGESTS

Tactics and the Design of Armored Fighting Vehicles

Digested at the Command and General Staff School from an article by Lieutenant Colonel D. R. Skinner, Royal Tank Regiment, in *Journal of the Royal United Service Institution* (Great Britain) November 1944.

It need hardly be reiterated here that the conception of the tank was British and that as a war machine it influenced the fighting in the 1914-18 war. The fact that the introduction of the tank was brought about by a tactical situation which demanded a new design of weapon capable of increasing the power of attack over defense is a fair example of the interrelationship of design and tactics.

In the last war the combined power of artillery and machine guns had strengthened the defense to such an extent that the opposing armies on the Western Front were reduced to a state of position warfare, and before the advent of the tank the concentration of overwhelming manpower and fire power in the field was the most important factor in gaining successes, although involving considerable loss to the attacking army in personnel.

The absence in 1916-18 of enemy tanks of any importance meant that British tank units in battle could concentrate on their main role of overcoming ground targets which were holding up the infantry. During the years between the wars it was reasonable to be prepared for an increased number of tanks on both sides in the next war, and to evolve tactics and vehicles suitable to deal not only with ground targets but other armored vehicles and aircraft. Furthermore, a peacetime army reverts to training in mobile warfare on the assumption that the opening of any campaign in a new war will be mobile. We commenced this war, therefore, with untried ideas both for dealing with enemy tanks and for the use of tanks in mobile warfare. The art of combining the use of armor and other arms, not to mention the vast use of mines, was only in its infancy, and in the initial campaigns in the Desert was more highly developed by the Germans than ourselves.

Tactical and technical development in peacetime had evolved two types, apart from the light tank—the infantry and cruiser tanks. The infantry tank, as the name implies, was to work with the infantry in the combined attack, while the cruiser was a basic machine with which to equip the newly-forming armored divisions. The evolution of the two types was necessitated by limitations in design possibilities. The requirements of infantry and cruiser tanks in protection and mobility were so different that they could not be combined in one type. For instance, the infantry tank, requiring the maximum protection with adequate weapons, was only needed to cooperate in a relatively slow-moving combined attack. A low power-weight ratio of nine to ten h.p./ton was sufficient, and thus slightly more armor could be carried at the expense of speed.

The cruiser tank, on the other hand, which was to be used to equip the highly-mobile armored division, required as a first consideration a maximum speed of not less than thirty miles per hour. The weapon being

equally important, protection was bound, therefore, to suffer in order to arrange the high power-weight ratio to give the specified performance.

The armored car as a wheeled vehicle has characteristics which make it suitable only for roles such as reconnaissance, requiring high mobility and silence. Its ability to carry only relatively light armor and its limited overall weight are further reasons for using it as a reconnaissance vehicle. It has, however, a long range of action and high speed on roads, which a vehicle in such a role requires. The tank is essentially a fully-tracked vehicle, which is the best mechanical arrangement yet devised for combining weight-carrying capacity and cross-country performance.

Tracing the evolution in this war of the tactical use of the wide range of AFV's [armored fighting vehicles] is a vast subject, as so much depends on the type of country over which operations take place and this has varied considerably. Broadly speaking, however, armor, which appeared to have a relatively free hand in the early stages of the war, is now merely one of the many important arms which must cooperate in battle to achieve success. This position has been caused by the development of the technique of defense in the form of antitank guns, mines, air support, etc. Nevertheless, the countermeasures have not as yet caused a state of position warfare, but have necessitated an even wider study of tactics of all arms and an ever closer liaison between design problems and tactics.

The infantry and cruiser tanks have already been mentioned. The medium type, which has tried to combine the characteristics of both infantry and cruiser tanks, has been evolved by the United States with some success in the Sherman. For a short period in this war, chiefly during desert campaigns, this tank stood out from all other types, due mainly to the characteristics of the main armament, which fitted in with the tactics of armored formations, and to its high degree of reliability, but it also had better protection than the cruiser tanks in the field at that time. The maximum speed of twenty-five to thirty miles per hour was found adequate for tanks of an armored division.

It is interesting to note that the Germans also were equipped with a medium type of tank, but were versatile in the type of armament they mounted; and their initial successes were due to the combined use of armor and powerful antitank guns, a number of which were mounted on self-propelled mountings.

An AFV is a weapon that combines three tactical requisites: fire power, protection, and mobility. The man who has not studied tactics but possesses imagination and engineering ability might design a tank in which one of these three features predominates almost to the exclusion of the other two. He may concentrate on mounting as large a weapon as possible in the hope that the machine, when in action, will blow any opposition out of the way with its weapons, but he will probably unknowingly sacrifice protection and perhaps performance of the vehicle in doing so. Another man might favor having the thickest armor he can arrange on his machine with sacrifices in weapons and performance, since he takes the view that, provided with sufficient protection to withstand any form of attack, the vehicle will eventually be able to reach the objective intact. There is the third point of view that may occur to the designer—that of speed. If high speeds are to be achieved with an AFV, weight must be cut down to a minimum; this reduces protection and possibly armament or the number of rounds or crew carried, to the detriment of fighting efficiency.

If any of the above views were the basis of a successful design and were correct, it is merely an engineering problem to supply the article. Once produced, however, it is almost impossible for a designer to make a change overnight from a machine built for speed to one requiring a high degree of protection. It should be borne in mind that the designer also has to consider both production and maintenance aspects together with user requirements.

These rather exaggerated cases may appear far-fetched, but in one way or another they

are not unknown to happen. It is hoped by this example to bring out two most important points: (1) The tactical requirements must be defined and thought out so that the machine will be suitable for a number of different tactical situations and conditions for at least two or three years ahead in war. In considering the numerous conditions, the tactician may be tempted to ask for the impossible by demanding specific weapons, protection, and mobility which cannot be combined in the same machine. (2) It is therefore necessary to understand the possibilities, within the present stage of development of engineering, that can be achieved practically on a machine such as the tank.

The AFV which is a good compromise is sometimes described as a "balanced design," i.e., the right balance is achieved between fire power, protection, and mobility. The table on page 88 illustrates some of the important factors, under their relevant tactical headings, which go to make a "balanced design," and with which the designer has to compete. Tactical experience is therefore required to guide the design of even the detailed components.

To illustrate a few of the many points referred to in the table, let us take, for instance, the armament. It is suggested that the first consideration is the targets likely to be encountered and the determination of the ammunition required to destroy them. From this the size, weight, and characteristics of the guns most suitable are chosen.

The next consideration is how the guns are to be fired, whether from a moving or stationary vehicle; whether the AFV is going in to fight like a tank, in which case the main armament will be required to be brought to bear on any quarter, front, side, or rear. If a self-propelled gun, which will stand back and give covering fire, is being considered, then a less wide arc of traverse may be sufficient.

Every detail of the weapons and fighting arrangements is designed and situated in the vehicle for ease of handling in the role for which the vehicle is designed. The same reasoning affects the design aspects of protection and mobility. This is, perhaps, where the designer or engineer helps the tactician. Once the designer has thoroughly understood the "requirement," he may evolve from his knowledge of the engineering and technical world more efficient means to do some job, the resulting machinery being less bulky and more reliable. This work constitutes the main function of the designer, who is always probing the technical world for something that will help the tactician. Sometimes some quite new idea or technical development will require simultaneous technical and tactical investigation. Instances of this nature are always under development, particularly with special devices such as ancillary equipment to armored formations, which must be provided with means of detecting and destroying mines, breaching obstacles, crossing rivers, etc.

In order to arrive at a reasonable arrangement of armor without increasing weight, the designer and tactician must consider each other's problems and arrive at a practical solution, usually a compromise, to produce a fightable machine and an engineering proposition.

Pursuing further the subject of the protection of a vehicle, it can be shown that the increase in weight of the side armor of a tank is four times that of the front armor, when the thickness of each is increased by the same amount.

The tactician would usually prefer to have one surface of his tank immune rather than have no immunity at all, and thus we find the front of tanks very often heavily armored while the sides are dangerously thin. If the tactician, therefore, can produce such tactics that he is always facing his enemy and can protect the flanks of his tanks against attack by suitable dispositions, then unequal armor distribution can be arranged to suit the tactician.

An interesting point in connection with the armoring of the front of tanks is the necessity of having the mechanical features of the vehicle to suit. If it is dangerous to present the weak sides of a tank to the enemy, there must be some provision for propelling the vehicle at reasonable speeds both forward

and in reverse, to avoid the tank, or for that matter the armored car, having to turn when in difficulties.

It is hoped that the above examples illustrate the interdependence of the design and tactical use of an AFV. With the limitations imposed by weight, space, etc., it is essential that every item be chosen with regard to the maximum efficiency of the vehicle when in action. There are, of course, widely divergent ideas concerning the position and necessity of many of the smaller items, and the designer must endeavor to find a solution which will satisfy all concerned.

An Armored Fighting Vehicle

This is a weapon of offense combining three tactical features which are mutually conflicting as far as design is concerned. It is the role which the vehicle is to fulfil that decides the order of importance of the requirements to be specified.

The following table is an attempt to illustrate how the tactical requirement is connected with design. As the weapons in an armored fighting vehicle (AFV) are the means of destroying the enemy, the table shows a suggested sequence of thought in choosing the armament for a particular role. The weapon in the tank and characteristics of weapons to be encountered are the first considerations in evolving the required fire power and protection:

Fire Power	Protection	Mobility
Targets and Range of Engagement 1. Personnel and machine guns in prepared or unprepared positions. 2. Antitank and field guns. 3. Thin-skinned vehicles. 4. Other AFV's, stationary or moving. 5. Concrete emplacements, bunkers, etc.	*(a) Passive* Broadly speaking is: Thickness of armor.	Mechanical reliability with minimum of maintenance.
Method of Engagement 1. Direct. 2. Semi-direct. 3. Fully indirect.	Armor thickness is limited by the weight-carrying capacity of the vehicle.	*Performance* Road and cross country. Obstacle-crossing capacity. Circuit of action. Maneuverability.
Ammunition Considerations Type, number, and size of rounds required to destroy the targets and for use in ranging.	Distribution of armor.	
Weapons The above considerations will lead to the choice of weapons and determine the caliber, etc., and fighting compartment design.	Silhouette and Camouflage.	*Speeds* Average and maximum: 1. Individual machines. 2. Collectively.

Fire Control

The type of weapon and tactical role of the AFV will determine the following:

1. Method and position of mounting (360-degree or limited traverse).
2. Sighting arrangements.
3. Control.
4. Number of crew for operation.

Fighting Arrangements

Adequate number and positioning of crew.

Internal and external communication and position of wireless set or sets in vehicle.

Vision devices.

Detailed points:

1. Moving armored parts protected against jamming (mantlet, turret race).
2. External mechanisms protected against high-explosive blast, etc.
3. Splash-proofing from small-arms ammunition.
4. Protection of ammunition and fuel in the tank against fire.
5. Anti-mine protection.

(b) Active

Grenades, bomb throwers, pistols, antiaircraft weapons, speed, and maneuverability.

Power/Weight Ratio

Transportation

Rail and road:

1. Off the battlefield.
2. On the battlefield.

Bridging

Wading

Recovery

Cavalry and Mechanization

Translated and digested at the Command and General Staff School from a Spanish article by Lieutenant Colonel Valero Valderrábano in *Ejército* (Spain) January 1945.

FOR centuries it was the task of cavalry to play the decisive role in battle. In more recent times, however—the time of the first World War—the perfection of firearms, the allotment of an insufficient number of such weapons to the cavalry, and the progress of motorization finally brought matters to the point where mechanization disputed this role with cavalry.

The arm then passed through a period of grave crisis during which its usefulness was the subject of much debate, for its function as an exploring element was being very advantageously transferred to aviation and its speed was now surpassed by that of motor-driven vehicles. The reaction was not long in occurring. The arm began to correct its defects and to change just as other arms had done. It increased its fire power by introducing automatic weapons, its personnel was increased and their combat training with the use of firearms was perfected, and there appeared in the cavalry the first motorized units.

But in spite of this reaction, those who were responsible for the reorganization relegated the cavalry to a secondary role, blinded as they were by the brilliant development of aviation and mechanized ground forces and seeing in these modern means substitutes for the old arm, substitutes which, in view of their greater speed and power, were able to obtain the decision. With this in mind, the proportion of air and mechanized ground forces was augmented to an unanticipated degree while the cavalry arm was reduced to truly tiny proportions.

It is on this account that at the outbreak of the present conflict the majority of the belligerents found themselves with scarcely any cavalry at all, with the exception of Poland and Russia. Germany considered that she had no need for it in obtaining a quick decision—she had but one mounted brigade

—and indeed she did obtain the expected quick decision in the campaigns of Poland, Norway, Holland, Belgium, France, and Greece. The ten brigades of Polish cavalry and the five French divisions—some of the latter in process of being transformed into mechanized units—were helpless in the face of the crushing action of the German armor and aviation. These overwhelming victories, however, must not be attributed solely to the destructive power of modern weapons, but to the exceedingly poor employment that was made of the cavalry (as, for example, in Poland), to the enormous numerical disparity between the two belligerent formations, and to the overwhelming superiority of Germany in antiaircraft and tanks. Remember that the action in Russia and North Africa assumed a different aspect when similarly equipped forces faced one another.

When the present conflict broke out, Poland and Russia alone possessed an acceptable proportion of cavalry. But between these two cavalry organizations there existed a great difference in the matter of quality. For while the Russians had developed their cavalry as well as their other arms in order to provide it with a high degree of combat effectiveness, the Poles had retained the organization they had when the first World War came to an end, and the sacrifice they made proved useless.

The action of this efficient Russian cavalry was felt in a powerful manner in all phases of the fighting on the eastern front, as we shall show farther on. This means that the cavalry is not an arm that has been eliminated by the airplane and tank, but that it has its own missions alongside of these new means of combat, providing it is properly maintained from the standpoint of quantity and quality.

If we call to mind the characteristics of the cavalry—mobility (ability to move over any sort of terrain with the exception of high mountains), radius of action, speed and flexibility of maneuver, agility in reconnaissance, facility in withdrawing from combat, and shock power which, without decreasing its other properties, renders it capable of facing modern weapons, we shall reach the conclusion that these troops are particularly well suited for the following missions:

Before the battle:

1. Long-range reconnaissance.
2. Cover of front or flanks.

During the battle:

1. Envelopment and turning maneuver.
2. Exploitation of success.
3. Protection of open flanks.
4. Sealing of a breach.
5. Delaying action.
6. Counterattacks.

After the battle:

1. Pursuit.
2. Covering of withdrawal.

The following are missions of cavalry when it operates independently of other arms:

1. Raids into enemy-occupied territory.
2. Destruction of airborne troops or paratroops.
3. Guarding and protection of certain sectors of frontier.

Of the missions just indicated, some have lost and others have gained in importance as a result of the particular way in which modern military operations are conducted and the means that are employed. Others are new to cavalry.

Missions that have gained in importance are those of exploitation of success, envelopment and turning movements, raids into enemy-occupied territory, counterattacks, and delaying action. New missions for cavalry are represented by action against paratroops and airborne forces, support of armored forces, and protection of communication lines in the rapid and deep penetrations effected by the latter.

Thus, for example, in the encirclement operations against the 16th German Army at Staraia Russa, some 500 kilometers northwest of Moscow, the Russian cavalry performed one of its most brilliant operations. Its incessant attacks against the German flanks and rear, hindering the withdrawal of the forces trying to escape from the encirclement and

preventing the arrival of supplies, contributed in large measure to the destruction of several of the Reich's units.

When the Russian counteroffensive started in the winter of 1941, there were many attacks by the Russian cavalry on the enemy's flanks, during the course of which the cavalry proved its ability to travel over muddy terrain and, in the northern areas, over ice in cooperation with ski troops.

One of the missions in which the cavalry showed itself to be most efficacious was that of conducting raids into enemy territory. Filtering through the gaps in the enormous fronts, it delivered heavy blows on the enemy, carried out surprise attacks on moving command and headquarters personnel, and harassed with the utmost persistency the enemy's lines of communications. The German forces did everything within their power to exterminate these bold cavalry units, and for this purpose placed detachments equipped with automatic weapons at all important highway junctions and bridges—at all of which the cavalry, with no equivalent enemy forces to fear, simply laughed. The raids of the Soviet cavalry became more dangerous during the period in which the impassability of the terrain, due to mud, paralyzed the movements of the German troops.

In pursuit, while the forces of the Axis could do nothing against the Soviets because of lack of cavalry and because the precarious passability of the terrain prevented the use of mechanized units, the Soviets with their great masses of cavalry supported by their aviation were able to engage in energetic operations. Such a situation existed during the retreat of the German forces on the Kalinin-Tula front.

The Soviet cavalry also intervened successfully in actions against paratroops and airborne forces. It cooperated with Russian paratroops on various occasions, among which may be mentioned the operations in the Crimea in January 1942 and those at Smolensk in February of the same year.

Special mention should be made of attacks by mounted cavalrymen, a type of cavalry operation reserved at the present time for small units because of the great vulnerability of large masses of this arm when exposed to the fire of ground and air forces. Nevertheless, there have been many cases in the eastern campaign where attacks were made by large as well as by small mounted units, carried out not only against retreating, disorganized forces but also against intact formations as well. Small formations supported by aviation or tanks were successful, but attacks by large units resulted in very heavy losses.

An exception to the rule was the attack of mid-January 1942 in the Valdai Mountains, where five divisions of cavalry staged a mounted attack in successive waves and enabled the infantry to effect an entrance into the city of Selizharovo and neighboring positions abandoned by Axis forces.

But in the majority of instances, large cavalry forces have gone to pieces in the face of enemy resistance either because the enemy were able to keep their heads or because the Russians had not given sufficient attention to the preparation of the operation—had chosen unfavorable sectors or had attacked prematurely without the necessary fire support.

As we consider the possible missions cavalry may have to fulfil, we become aware of the influence exerted on its organization by the terrain in which it is to be employed and by new combat weapons.

The presence in the camp of the enemy of numerous and powerful firearms as well as of armored equipment makes it necessary, if cavalry is to execute missions requiring a certain amount of fire and shock power, that it include in its formations units well equipped with machine and antitank guns, as well as self-propelled automatic weapons and tanks. The intense activity which is to be expected on the part of enemy air forces necessitates the inclusion in these formations of an adequate number of antiaircraft units and, for the purposes of operations in which aircraft must cooperate, it is fitting that a few air force units form an organic part of large cavalry units.

To what extent shall armor enter into the composition of large cavalry units? If the

armor represents the shock power which in times past was expressed in the cavalry charge, it must be regarded as indispensable since, as we have already seen, the charge is the exceptional mode of operation of cavalry units. But neither armor nor the numerous automatic weapons necessary for a great volume of fire should be allowed to impair the most vital characteristic of cavalry, namely, its mobility.

There exist differing opinions between those who advocate purely equine divisions and those who, in view of the progress of mechanization, can see nothing but mechanized divisions. The first of these base their arguments on the fact that, since the horse is best suited for reconnaissance in terrain as broken as ours, they see no use for motorized means, and believe that in the majority of cases such means would constitute a handicap to the quick and flexible maneuver of cavalry.

As a matter of fact they are right, but only in part; for, without leaving our own country, we find areas of considerable extent on the plateaus of Castille, Extramadura, etc., where the motor can be used to good advantage. But there is, in our opinion, a matter of more vital importance to be considered. Although the mission of reconnaissance is one of the most important and also one of the traditional missions assigned to a cavalry division, it is not the only one. There are various others in which the principal task is not that of reconnaissance but of combat, though even this may be for the purpose of obtaining information.

The advocates of light motorized divisions, such as the French (*Divisions Legères Motorisées*) without any horse elements, influenced as I have said before, by the march of motorization and the astounding success of campaigns such as those of Poland and France, are not informed relative to our possibilities in the fields of motor manufacture and the importation of fuels. And if these successes were possible in a terrain such as those of Poland or France (the latter with a dense network of highways), this is not the case in Spain.

But there remains another aspect of the matter to be examined, that of the opponents of the mixed division. Their argument is based on the impossibility or difficulty of effectively moving units with differences of speed as great as one to three. Let us clear up this point.

If the division operates in broken terrain or with few routes of communication, the equine elements will not be able to attain a speed in excess of six kilometers per hour, nor will the motor vehicle travel faster than fifteen kilometers per hour. If the terrain is open and with an abundance of communication routes, the equine portions will be able to attain a speed of as much as ten kilometers and the motor vehicles, thirty kilometers per hour. That is to say that in either case the motor vehicles will be able to travel at a speed three times that of the equine portions.

It is true that the command of the division becomes complicated and that difficulties do present themselves when it becomes necessary to move the formation over long distances, yet these difficulties are not insuperable. For, in view of the breadth of the division front, it is possible to find, even in our own country, at least two routes that can be used for the movements of the motorized and equine elements—one for the horses and one for the motorized elements. This means that the latter will cover in a single day the space that it will take the equine portion two or three days to cover, and will be able to rest one or two days during which they will be able to check and repair their motors.

It is obvious that, in these mixed divisions, advantage is not always taken of the speed the motorized portion is capable of and that the equine portion acts as a brake. But this is not true to the extent it at first appears to be. Stop and consider that it is not necessary that all elements arrive with the same promptness at their particular objectives (the length of the column of a division of this type is about forty kilometers); that these divisions operate in very broad and deep zones where it is necessary to echelon the units with depths of fifteen to twenty or even more kilometers; and that as soon as initial contact has been established, there will

always, of necessity, transpire a period of some hours (in which the general is provided with information and makes his decision) before the rearmost units of the reserve are committed. Hence the differences of speeds that exist between the two types of units are compensated for largely by the requirements of the maneuver.

From the foregoing we can deduce that it would perhaps be best to have at our disposal at any given moment the type of division best suited for the purpose as determined by the mission and the terrain, either entirely horse or entirely mechanized.

This, it will be understood, would only be possible for a country of sufficient financial resources with an abundance of large units of all types. But even supposing that the one best suited for the purpose were available at any given time, we believe that the purely cavalry formation would always lack shock power, and the mechanized one would lack suitability for reconnaissance, agility, and flexibility.

Without question, the mixed organization with all its inconveniences appears to be the one that is best able to handle the extremely varied missions of the cavalry, and this must be the opinion of the countries that are engaged in the war and that have their cavalry organized in divisions of the mixed type.

These divisions possess the characteristics of power, medium speed, and great mobility, being especially suited for operating separately and on reconnaissance missions. They are able to establish rapidly a curtain of fire, have great ability in withdrawing from combat, and possess adequate offensive capacity against poorly organized positions. On account of their great volume due to the large numbers of vehicles and animals, they are quite vulnerable, and because of the means of transportation employed by them and the complexity of their training, they are easily crippled and hard to replace, being intended for maneuver and surprise operations rather than for operations on the basis of strength.

Summarizing the foregoing, we believe that air forces and mechanized ground forces—best adapted for employment in mass at the decisive point—are nothing more than new arms which do not supersede the old ones, but that all these arms complement each other, thus assuring, by means of cooperation, maximum efficiency in the modern battle.

The Vitebsk Operation

Translated at the Command and General Staff School from a Russian article by Colonel S. Shishkin in *Krasnaia Zvezda* (Red Star) 25 October 1944.

THE Vitebsk operation was a part of the strategic plan the purpose of which was the destruction of the central group of German armies in White Russia in the summer of 1944. The Vitebsk fortified area formed the pivot, as it were, of the left wing of the central group and connected it with the northern group, thus covering the routes leading to the Baltic area. That was the reason why the German command tried so doggedly and persistently to hold on to the city of Vitebsk.

The Germans had been building and improving fortifications around Vitebsk for a long time. There were two main fortified lines north, east, and south of the city (see sketch). The first line was from twelve to fifteen kilometers from it. The second line —the inner belt of fortifications—was in the immediate vicinity of the city. The city itself had been transformed into a fortress. The fortifications were reinforced by a considerable amount of artillery and manned by the best available troops: the 53d Army Corps comprising the 246th, 206th, and 4th Infantry Divisions, the 6th Air Force Field Division,* and the 197th Infantry Division of the 6th Army Corps. Besides, the Germans had considerable reserves in this area.

As a result of the operations in the fall

* *Luftfelddivision*: air force field division, fighting as ground force.

and winter of 1943-44, the Soviet troops had driven wedges into the enemy lines and had captured a series of advantageous positions northwest and southeast of Vitebsk, which was the beginning of its envelopment. The troops of the First Baltic Army Group and of the 3d White-Russian Army Group were charged with the liquidation of this stronghold.

The troops of Lieutenant General Beloborodov, disposed north and northwest of Vitebsk, were to deliver the main attack by their right-flank units, breach the enemy line north of the railroad Vitebsk-Polotsk in the sector Novaia Igumenshchina-Toshnik (thirty kilometers northwest of Vitebsk), rout the German group at Shumilino, reach the Western Dvina River in the vicinity of Gnezdilovichi and west of it, capture bridgeheads on the southern bank of the river, and advance with part of the forces in the direction of Vitebsk, thus pushing the enemy eastward.

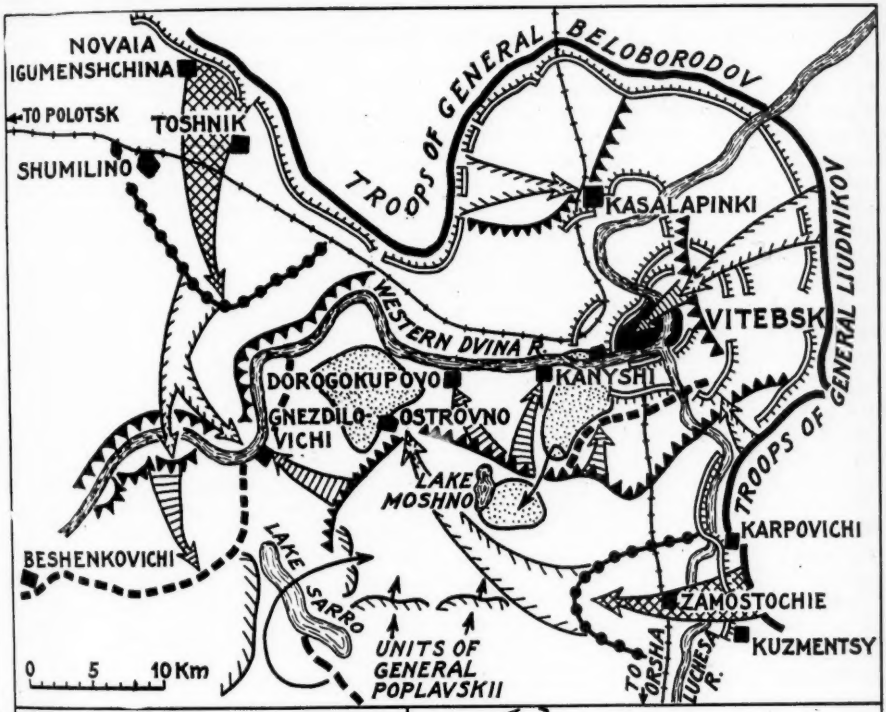
At the same time, the troops of Lieutenant General Liudnikov operating east and southeast of Vitebsk were to make their main attack using their left flank units in the direction Zamostochie-Gnezdilovichi, breach the German defense in the sector Karpovichi-Kuzmentsy (fifteen kilometers south of Vitebsk) and come out on the third day of the operation near the southern bank of the Western Dvina on the line Ostrovno-Lake Sarro. Here they were to join the troops of General Beloborodov and complete the encirclement of the Vitebsk group. Part of their forces was to attack westward in the direction of Beshenkovichi, where they were to be joined by the tank units of the First Baltic Army Group, which was to be moved into the breakthrough northwest of Vitebsk. Furthermore, General Liudnikov's force was to capture Vitebsk in cooperation with General Beloborodov's units, and to destroy the encircled enemy group. Thus one could distinguish two stages in this operation: the first stage was the breaching of the fortified position and the exploitation of success aimed at the encirclement of the enemy group; the second stage was the liquidation of the encircled troops and the capture of Vitebsk.

Careful preparations were made by our command. All training was organized in accordance with the missions assigned to the participating units. In this training, the experience of the preceding offensive operations near Vitebsk had been taken into account, and the German fortifications had been studied in detail. The units which were to be used in the breakthrough stage were trained in the areas specially equipped to reproduce the Vitebsk fortifications of the enemy. The emphasis was laid on the close cooperation between the infantry on the one hand and the artillery and tanks on the other. Proper coordination of their actions was achieved due to the fact that the artillerymen, infantrymen, and tankmen all trained together. The technique of infantry advance under the conditions of trench defense was also carefully worked out. The attacking infantry was required to move forward rapidly and continuously. The idea of the training was to master the technique of uninterrupted forward movement over the enemy trenches. This technique was to enable us, even on the very first day of the offensive, to penetrate the enemy position to a depth of twelve to fourteen kilometers, i.e., to advance through the tactical zone of the defense and occupy the area of enemy artillery positions. As the offensive called for crossing rivers, our troops had been issued crossing equipment, boats and portable pontons. Furthermore, we had formed several special groups who were to prevent the enemy from blowing up bridges. Because of these groups, the Germans were later prevented from destroying two bridges south of Vitebsk and the New Bridge in the city. Because of the successful operations of these groups, our tankmen quickly drove over the bridges and secured the advance of the infantry.

The general offensive was preceded by operations of the reconnaissance units. On the eve of the offensive, they succeeded in capturing by a surprise attack a series of enemy positions in a sector adjacent to the troops of General Beloborodov. This made

the enemy transfer part of his reserve to this sector.

A powerful artillery and aerial preparation along the entire front began in the morning of 23 June. At 0700, the troops of the enemy positions. Rapidly exploiting their success, the troops of the First Baltic Army Group, by a turning maneuver, captured a large enemy center of resistance, Shumilino, (thirty-six kilometers northwest of Vitebsk)



General Beloborodov, operating as part of the shock group of the First Baltic Army Group, went over to the attack together with the troops of the neighboring guards units. Accompanied by close support tanks and self-propelled guns, the infantry broke through and cut the railroad Vitebsk-Polotsk. The Germans attempted to delay the advance of our troops by launching violent counterattacks by infantry groups supported by tanks and self-propelled guns, but did not succeed. By the end of the first day of the offensive,

General Beloborodov's right flank units, having repulsed successfully all the enemy counterattacks, had advanced sixteen kilometers and, with the aid of the troops operating on their right, had widened the breakthrough to thirty kilometers.

The troops of General Liudnikov attacked at 0900 on the same day. The main attack was delivered on a narrow, six-kilometer sector by one guards division. This unit pierced the enemy position south of Vitebsk, forced the crossing of the Lucheza River, and cut the railroad Vitebsk-Orsha at Zamostochie. In the vicinity of Zamostochie, the guardsmen encountered and captured the entire artillery of the German 197th Infantry Division. General Liudnikov's guards units continued to exploit the success. Moving to the northwest, they had advanced thirteen kilometers by the end of the day.

During the first day of the offensive, the troops of the First Baltic Army Group routed the units of the German 9th Army Corps and forced them to withdraw hastily to the south and southwest. In order to prevent the enemy from organizing a new defensive position on the Western Dvina, the command of the Army Group sent ahead a strong force of infantry (in trucks) and tanks. Their mission was to establish a bridgehead on the south bank of the river. In the meantime, General Liudnikov's troops defeated the German 197th Infantry Division, pushed its remnants to the northwest, and routed the 280th Regiment of the 95th Infantry Division which had been sent by the Germans to the rescue of their troops.

On 24 June the offensive of our troops was developing in an ever-increasing tempo. General Beloborodov's troops, advancing to the southeast and successfully repelling all hostile counterattacks, had reached by the end of the day the northern bank of the Western Dvina west of Gnezdilovichi, and his advance guards had captured several bridgeheads on the southern bank. The left-flank units succeeded in breaching the enemy line north of Vitebsk and, moving to the south, reached the vicinity of Kasalapinki, eight kilometers north of the city. At the same time, General Liudnikov's left-flank units, exploiting the success gained the previous day, reached the sector of Ostrovno. This started a number of fierce engagements with the German screening forces on the approaches to the south bank of the Western Dvina. The advance of our troops to Ostrovno had cut the German lines of retreat from Vitebsk to the southwest.

In the meantime, the right flank units, operating on a broad front east of Vitebsk, were concentrated into a large striking force by order of General Liudnikov. They attacked Vitebsk from the east and, having broken the enemy resistance, approached the eastern outskirts of the city. The enemy offered furious resistance on the approaches to and southwest of the city. On the night of 24-25 June, the guards units operating on the left flank of General Liudnikov's troops struck toward Gnezdilovichi and reached the southern bank of the Western Dvina. Here they joined the troops of General Beloborodov. The ring of encirclement was now closed. The troops of the German 53d Army Corps, its commander, staff, and all their matériel were inside the ring. During the same night the left flank units of General Liudnikov's troops broke into Vitebsk and engaged the enemy in street fighting in the eastern part of the city, pushing him to the west. Simultaneously with the advance to Gnezdilovichi, the guardsmen launched two attacks northward toward Dorogokupovo and Kanyshi and reached the Western Dvina in this sector.

As a result, the enemy forces were split into two groups. The first group, composed of two regiments of the 6th Air Force Field Division and the 206th and 246th Infantry Divisions, was cornered southwest of Vitebsk. The second group, made up of units of the 4th Infantry Division and one regiment of the 6th Air Force Field Division, was encircled north of Ostrovno.

During the night of 25-26 June, the left-flank group of General Liudnikov's force infiltrated into the center of Vitebsk and suddenly attacked the New Bridge across the Western Dvina. Having captured the

only bridge left in the city, they struck at the remnants of the enemy garrison and forced it to withdraw to the southwest. But this line of retreat was already cut. After furious street fighting in the northern and southern outskirts of the city, the troops of General Liudnikov, together with the left-flank units of General Beloborodov, had completed the occupation of Vitebsk by 0600, 26 June. Stubborn engagements were still raging southwest and west of Vitebsk with the encircled German groups. During 26 June the enemy was making desperate efforts to break out from the tightening circle. He launched twenty-two counterattacks, but all his attempts to break out westward were frustrated by our artillery and infantry fire. Only an insignificant part of the German group encircled southwest of Vitebsk had succeeded in escaping and in reaching with great losses the woods in the vicinity of Lake Moshno. Against this group were immediately directed the units of General Poplavski, who was at that time operating south of Vitebsk, and also some of General Liudnikov's forces east of Lake Moshno.

In the afternoon of 26 June and on the night of 26-27 June, our troops continued to press the encircled and isolated enemy groups, while our bombers and attack planes inflicted tremendous losses on the enemy. In the morning of 27 June, General Liudnikov launched a concentric attack from three sides against the largest German group southwest of Vitebsk. The enemy group was once more cut into several parts and its resistance was broken. Most of the encircled troops refused to surrender and were destroyed. Some accepted our ultimatum and surrendered in the morning of 27 June. By this time, the group encircled north of Ostrovno had also been liquidated.

One of the peculiarities of the Vitebsk operation was the fact that the breakthrough had been made by the adjacent flank units of two army groups. This called for highly coordinated action on the part of the attacking troops. The second peculiarity was its rapid tempo, for the full encirclement of the enemy and the destruction of five of his divisions had been carried out within five days. Of great importance to the success of the operation was the element of surprise. This was the result of the continuous action of our reconnaissance units. Furthermore, our registration fires were not limited to the areas intended for breakthrough operations, while all concentrations and regroupments of our troops were carried out only at night. Owing to these and other measures, the enemy was confused as to the time and direction of our attacks. The determined action of our advance elements compelled the Germans to expend some of their reserves on the eve of the general offensive, and enabled our troops to occupy the most favorable line of departure. The rapidity in the operations of our troops during the exploitation stage made it possible to complete the encirclement ahead of schedule. The aircraft, too, were of great assistance to the ground troops during all the stages of the operation. Whenever the enemy attempted to break out from the tightening ring of encirclement, our aircraft—bomber and attack planes—would locate the direction of his movement and attack his retreating units.

The RAF in the Imphal Valley

From an article by Graham Davies in *The Aeroplane* (Great Britain) 2 February 1945.

THE Battle of the Imphal Valley, fought in northern Burma last spring [1944], has long since passed into history, that is to say, into oblivion. Some people may remember the Wingate airborne landings which preceded that action, but little has ever been said about the absolutely vital part played in it by fighter squadrons of the Royal Air Force.

These squadrons are still in Burma. They are still fighting, and many of them live on

jungle airfields hundreds of miles from civilization.

Colonel Wingate's expedition made its famous airborne landing behind the enemy lines in March 1944, with the object, as its commander told his men, of seeking out the enemy, engaging him, and causing the maximum dislocation to his communications. Our troops in Burma were vastly outnumbered at that time, and the Japanese were seriously threatening India. Had they managed to effect anything like a large-scale breakthrough into eastern Bengal, it is difficult to see what could have stopped their further progress.

There were two major enemy offensives during April; the 14th Army halted them, but the Japanese advance had surrounded four divisions of British and Indian troops. They were penned in a high valley which became known as the Imphal Box, but only three divisions were actually in the fighting line, as the fourth had retired up the Tiddim Road to re-equip.

Air supply to the Chindits had been continuous since Wingate's landing in March, and this supply now had to be extended to the trapped divisions, a most formidable proposition, even with air superiority on our side in the skill and quality of our fighter pilots, although certainly not in numbers.

The Imphal Valley lies at an altitude of about 2,000 feet above sea level. It is a curious lozenge-shaped plain, forty miles long with a maximum width of twenty-five miles. The floor of the valley is dead flat, apart from a number of remarkably high "pimples" which stick up here and there, and it consists very largely of cultivated land. Completely enclosing this valley is a rim of hills which, in this country, we should call mountains as they rise to an altitude of 7,000 feet at some points.

The Japanese hauled their artillery up and on to these hills and thus dominated much of the plain. The work of Royal Air Force fighter squadrons was, first, to give close army support, protecting ground troops against Japanese fighter-bombers, and at the same time to protect the constant stream of Dakota transports bringing in supplies from India. Army reinforcements were urgently needed, and early in May a whole brigade was flown into the Box, complete with its equipment. By this time the Japanese had cut all communicating roads and occupied all the heights surrounding the valley.

A regular air transport train was organized, Dakotas and Mitchells arrived each day from India, bringing food, ammunition, medical supplies, and all the hundred and one other items needed by an army of some 45,000 men, completely isolated in a valley hundreds of miles from anywhere, and fighting all the time. Casualties, of course, were evacuated by air.

Several RAF squadrons were operating from the Imphal Box, two of Supermarine Spitfire fighters, others of Hawker Hurricane fighter-bombers, and one Tactical Reconnaissance squadron of Hurricanes employed chiefly on photographic work, while another Spitfire fighter squadron not actually based in the Imphal Valley arrived there every morning from its base outside, put in a day's work and flew home at night.

All petrol for operational flights had, naturally, to be brought in by air, and strict economy in its use was necessary. Three hundred transport aircraft arrived and departed each day, but they had many other urgent loads to carry besides petrol for the RAF. The warning system against enemy air attacks did not function well owing to the ring of mountains all around the Box. Thus fighter squadrons seldom knew anything about the enemy's approach until he was actually inside the valley and attacking.

If the enemy formations came in high, that is to say, at 15,000 feet or so, our radar worked well enough, but the Japanese soon tumbled to this and came skimming in over the hills as low as possible. One squadron commander organized a system of warnings by native drums. The idea horrified brass-hats at Delhi, but worked fairly well. Wireless pack-sets, as used in fighter aircraft, were eventually carried up on the hills and employed with success.

Supplies were flown in from Indian bases about 200 miles away. Airstrips in the valley

were laid out by units of the Royal Engineers. The land is mostly paddy fields, and as runway surfaces were simply beaten earth the dust was horrible. On the main airstrip used by transports, the runway was an impressive affair. It should have been 4,000 feet long, but, by a slight error in instructions received by the Royal Engineer constructional unit concerned, this was given as 4,000 yards. Nothing ever shakes the Royal Engineers, and the immediate result was a runway exactly two miles 480 yards long. This important stretch of runway, located in the middle of the Imphal Valley, eventually proved most helpful. If the "Daks" could not use one bit, another would be available. Thus the Royal Engineer effort was by no means wasted. The work of that splendid corps seldom is.

The work of Royal Air Force fighter squadrons in protecting Dakota transport aircraft supplying the Box was so efficient that out of thousands upon thousands of Dakota sorties flown, only twenty aircraft were lost in the whole long-drawn Imphal battle. Their opponents of the Japanese Air Force were flying the Osk Mk. II fighter, and of these No. 607 Spitfire squadron alone accounted for twelve definitely destroyed, nine probable—and a probable in that jungle country is usually a certainty—with twenty-six damaged, some so badly that they may also be counted out. The surrounded divisions were eventually relieved; as we know, the Imphal battle was won, and the armies moved slowly southwards. Forward airstrips were carved out of the jungle still farther forward and RAF fighter squadrons lived on them. Conditions of life have, however, vastly improved since Imphal.

During the Battle of the Box, flying and ground personnel alike inhabited trenches and foxholes alongside the strips, sharing their lodgings with unattractive tropical fauna of the region. Snakes are a pest, even for those interested in zoology, and they include the deadly little krait, whose bite may cause death within minutes. Happily, however, casualties from snake bite are surprisingly rare, although the poisonous varieties are so common.

The camps are often at least 200 miles from the nearest civilization, and all necessities of life arrive by air. Blistering sun and dust change, during the rainy season, to a steamy, hot-house atmosphere in which everything goes mouldy and one's personal belongings grow whiskers of fungus. Over all is the all-pervading stink of the Far East, only worse than usual because of the conditions in which one lives.

Our air losses in Burma have, up to now, been relatively light, but the RAF pilot on an operational sortie has always a nasty thought at the back of his mind which does not apply to his counterpart in the European war theater. The pilot who bales out over Germany knows that he is likely to be treated as an ordinary prisoner of war, under the Geneva Convention, while the man who bales out over Burma may end up as an object for vivisection on the kitchen table of some Japanese officers' mess. This is no reflection upon German capabilities of bestial savagery in that direction, but the German has a fear of what is coming to him in the near future from east and west, whilst the Japanese believes, perhaps rightly, that his war will go on for years and years.

Armed Forces of the Future

Translated and digested at the Command and General Staff School from an article by Captain of the Navy J. G., in *Bellona* (Polish) October 1944.

ONE cannot revolutionize strategy, for strategy is an art based on history, tactics, and other sciences. Its scope has tremendously increased at the present time and has reached new fields, such as economics, sociology, industrial technique, etc.

We may speak, therefore, of the evolution, rather than the revolution, of strategy and

tactics under the influence of technological progress, an evolution which does not result in discarding all present weapons and methods, for the jet plane is only an improved form of the present plane; the flying bomb is only an improved form of the artillery shell; and the tank, a perfected combat chariot of the Greeks and Romans. Likewise, the tremendous and unparalleled development of aviation does not mean that aviation alone will be the decisive element in future wars.

The bases of the air forces will always be on the ground. They will have to be defended not only in the air but also on the ground and on the sea. Oceans and seas will continue to exist, and the principle of *navigare necesse* will by no means be changed, although we shall have planes capable of carrying, say, 300 tons of useful load. The submarine will stay too, and although the means of combating it will increase, the submarine itself will be improved.

When the Treaty of Versailles prohibited the Germans from building large war vessels, their inventive spirit did not seek a revolutionary solution. The German engineers created a new type of vessel—fast, well armored, relatively well armed, and of only 10,000 to 13,000 tons.

Aviation, of course, has a great future. But even if the problem of "standing motionless in the air" is solved, it will revolutionize nothing. Wars will be fought on the ground and on the sea as long as men live and work on the ground and ships cross the seas. The air then might become a means of achieving domination on the ground and on the seas.

The navy is often considered conservative. This is true, but only in the sense of *navigare necesse*, for from prehistoric times ships have sailed to insure the existence, the welfare, and the security of mankind. The invention of the plane, therefore, was likely to produce only a serious tactical change but no decline of the navies. Nobody would transport large quantities of ore, coal, gasoline, and corn by plane, because it would not pay. And since there will always be merchant ships, there will also be warships. Since there will be escort planes, there will also be escort ships.

The conservative character of the fleet is not without reason. When the self-propelled torpedo was invented, it seemed to spell the doom of the battleship. The same was repeated later in connection with the appearance of the first submarine, and again when Douhet came out with his theory in connection with the development of the aircraft. The United States, where the development of the aircraft has attained its highest peak, is now building super-battleships of 50,000 tons.

There has always been and always will be an army, but it is erroneous to believe that it will retain its old organizational and tactical forms. Even today, the tactical unit is becoming smaller. We shall have, if we do not already have it, the tactically independent and thoroughly equipped company. The number of men in all units will decrease with the increase of technical improvements.

The role of the army may also change. If the mission of the "conservative" navy is still to secure the naval communications of its country and deny them to the enemy, the task of the army in the future will be first of all the defense of the operational bases of the aircraft and navy. This does not mean strategic defense, and still less passive defense. But the air force and the navy will always have a greater strategic scope than the army, and their operations will, therefore, be conducted on a larger scale. The army will secure them freedom in conducting these operations and exploit and complete their achievements. The operational coordination of the land troops, navy, and air forces has been put into effect during the present war without disrupting the organizational independence of these three branches.

In Great Britain, the Ministries of War, Navy, and Air have maintained their distinctiveness. This facilitated the combined operations in the invasions of Africa, Italy, France, etc. The commanders in these operations were either generals or admirals, for a modern commander must be able to conduct an operation comprising the activities of all arms and services.

From this standpoint, let us cast a glance at the future of the armed forces—not from the technical point of view, though, for no one knows what new inventions and improvements the war still has in store for us.

Although we frequently encounter the opinion that the army, navy, and air force constitute the so-called "principal arms" or simply "arms," this view is erroneous. The navy and air force have their own arms, while the army has artillery, sappers, infantry, etc. The army, navy, and air force are the component parts of the armed forces of the nation, and they all contain or employ different arms: artillery, signals, paratroops, bombers or pursuit planes, etc. In the future, however, these arms will probably disappear. They will be supplanted by specialists in various weapons and techniques. In the army, a battalion (and perhaps a company) will have its own artillery (light, heavy, antitank, antiaircraft), its own tanks, sappers, signal service, and its own aircraft. The soldier will be assigned not to an arm but to a special weapon within the bounds of his unit. In the future, we shall no longer speak of an infantry or artillery regiment, but of a regiment or battalion of troops.

The role of concrete fortifications and other structures will increase tremendously. The war industry and various public utilities will have to take refuge underground. Every house will be supplied with a deep shelter. All the warehouses, bases, and arsenals will be covered by several meters of concrete and earth.

The importance of the navy in small or inner seas will not decrease, but increase due to "aeroamphibian" necessities. Military action will be a combination of ground, naval, and air operations. The army, navy, and air forces will become then actually the "main arms," while the present arms will disappear and be replaced by specialists.

The organization of the three main arms will be hierarchically independent and as much specialized as possible. The command will also be separate and independent. The organization of supreme command will depend on the structure of the given state, but one may envisage a joint general staff comprising the representatives of all three main arms, hierarchically equal regardless of the numerical importance of their respective branches.

Numerically, the army (in peace time) will undergo an enormous reduction. Mobilization in the old sense will be impossible; it will have to be conducted secretly, gradually, and prior to the beginning of hostilities. Industry will have to meet demands for rapid production schedules, but also be prepared for various other changes. War matériel must be in abundance but not in excess, to avoid accumulation of obsolescent and obsolete models. The whole nation must be prepared for duty within or outside the armed forces. Large masses of civilian population (school, plants, etc.) must be involved in active and passive antiaircraft defense.

Military preparation affects the whole nation—from children to old people. This, however, does not mean militarization in the Fascist sense. But everyone must know what to do in case of war; everyone must cooperate for the defense of the country.

The adoption of new weapons must run parallel to technological progress. The development of new weapons should be pressed on not only during the war but also in peacetime to avoid lagging behind and facing later unpleasant surprises in the field of strategy and technique.

The domination of the sea, according to B. Brodie in the *Guide to Naval Strategy*, does not imply ships only. It implies all the branches of national defense tending to maintain naval communications in time of war. If the air force plays an important part in it, it should be kept in mind that in doing so it acts as an arm of the armed forces operating with the navy and for the navy. The same to a certain extent (defense of bases and coastal defense) may be applied to the army. The navy, on the other hand, by its domination of sea communications, offers the army and the air force possibilities of action on the largest possible scale.

It would be an exaggeration to state that

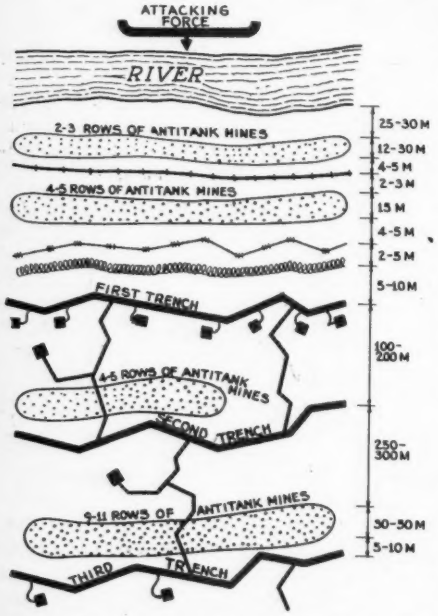
the officer of the future will be "aeroamphibian" and able to command a battalion on the ground, a squadron in the air, and a naval group on the sea. Such an officer might be compared to a goose that walks, swims, and flies, but is an equally poor walker, swimmer, and flier. It is clear, however, that each senior commander will have to know thoroughly the strategic and tactical possibilities of the three "main arms," and that his action should be objective and with absolute disregard of his own original arm.

"Military art and the task of creating adequate armed forces require continuous and daily improvement based on knowledge and experience"—so wrote Vegetius in the Fourth Century. This rule has not changed yet.

Notes on German Field Fortifications

Translated and digested at the Command and General Staff School from a Russian article by Engineer-Major J. Galkin in *Tekhnika Molodezhi* April 1944.

As a general rule, the Germans establish their positions on heights, along rivers or lakes, on road junctions, around important settlements, etc. They do everything possible to strengthen all natural obstacles on the approaches to the position. When the position is built along a river, for example, its bank is made as inaccessible as possible. Its slope is made steeper and it is kept iced in the winter time. The bottom of the river is frequently mined. In winter, holes may be cut in the ice and converted into various clever traps. All important obstacles and emplacements are erected on the enemy's side of the river. Twenty-five to thirty meters from the bank, one finds two or three rows of mines (see sketch). The mines are staggered, arranged in rows, or laid irregularly. A few antipersonnel mines may be mixed with antitank mines. On roads, one often encounters mines arranged in three "stories." Should the top mine be removed, there will be another mine on the "second floor." The "second-floor" mine, while exploding, will cause the explosion of the lower mine, which increases the general blasting effect.



Four or five meters beyond the first row of mines, the Germans erect from one to three rows of barbed-wire entanglements. The German barbed-wire obstacles vary considerably. They use simple barbed wire, spiral wire, high wire entanglements on wooden or metallic pickets, and chevaux-de-frise. These barbed-wire obstacles are reinforced by mines suspended from the wires and exploding when the wire is cut. Shell cases, empty cans, and other sound-making objects are frequently hung on the wire obstacles.

Another four or five rows of mines are found two or three meters beyond the first wire obstacle. This mine field, in turn, is followed by a reinforced barbed-wire fence.

From two to five meters beyond the fence, one usually finds a spiral-type, plain wire constituting a serious obstacle.

Thus, the zone of artificial obstacles may be from forty to sixty meters deep. To overcome such a zone, especially when it is located beyond a river, is not easy.

The first line of trenches starts about five or ten meters from the barbed-wire fence. The trench is a narrow ditch from 1.8 to 2.0 meters deep. Its width is about half a meter at the bottom and about four-fifths of a meter at the top. The trench has a zigzag trace. Each section of the trench is eight to ten meters long, with parapets on both sides.

Individual emplacements for riflemen, submachine gunners, machine gunners, and observers are built all along the trench. Machine-gun emplacements are spaced from six to ten meters apart. Rifle pits are from one and a half to two meters from each other.

The Germans pay much attention to the construction of emplacements for machine guns. These emplacements are so constructed that they can be used for firing a variety of weapons: machine guns, submachine guns, and antitank rifles. That is why they are called universal emplacements.

In addition to rifle pits, machine-gun emplacements, and observation posts, the trenches are equipped with shelters. Some shelters are dug in the walls of the trench in the immediate vicinity of the machine-gun platforms. Others are built about five or ten meters away from the trench and are connected with it by communication trenches. While the trench shelters are designed to provide cover for one or two men, the other type are constructed so as to offer shelter for eight to ten men. The large shelters are dug into the ground and have an overhead cover of two or three rows of logs covered by earth. Its overhead cover does not extend beyond the ground line.

During lulls, the men off duty stay usually in the large shelters. A signal system connects the firing emplacements with the shelters (pull-wires with improvised bells).

In addition to open weapon emplacements, important areas are reinforced by covered emplacements, such as steel pillboxes and timber-and-earth bunkers.

All basic infantry weapons are concentrated in the first trench. The effective range of the machine gun is about 800 meters, and that of the submachine gun, about 300 meters. The great number of emplacements connected with each other by the continuous trench facilitates the maneuvering of fire means.

The second trench, connected with the first by communication trenches, is about 100 or 200 meters from the first one. The number of weapon emplacements—rifle pits and machine-gun emplacements—in the second trench is smaller than in the first one, but the fire means located here are usually more powerful. Frequently, mortar and antitank-gun positions border upon the second trench. While the first trench contains mostly flat-trajectory weapons (machine guns, submachine guns), the second has mortars which cover all approaches to the main line of resistance.

As a general rule, the first trench can be taken under accurately prepared German fires as soon as it is captured by our troops.

Antitank-gun positions are carefully prepared. They are provided with bunkers for gun crews, shelters for the guns, and an ammunition shelter.

Many approaches to the second trench are mined. The communication trenches connecting the two trenches also have emplacements for riflemen and submachine gunners.

The third line of trenches is located at a distance of 250 to 300 meters from the second trench. It is protected by a wide mine field consisting of nine to eleven rows of mines. This trench has only few weapon emplacements and constitutes a reserve position. Command posts, shelters, and sometimes artillery positions are located there.

The number of trench lines may reach six. Beyond the trenches one finds separate defensive areas in settlements and villages.

The zone of continuous trenches is from 800 to 1,000 meters deep, while the zone of defensive areas has a depth of from six to ten kilometers. Each defensive area, in turn, consists of a series of trenches with a well-developed system of weapon emplacements.

Airborne Operations

Digested at the Command and General Staff School from an article in *The Times* (London) 8 March 1945.

MEMBERS of the British Airborne Army readily concede that the technique of using parachute and gliderborne troops is still so much in its infancy as to be to some extent experimental, and that as more experience is gained, improvements will be possible with both technique and equipment. A few cardinal principles for the successful employment of airborne forces are, however, clearly established. They are that the side employing them must possess air superiority; that the weather must be favorable; that spearhead troops must only be used in areas which can be reached within a measurable space of time by normal troops who can relieve them; that an adequate number of troop-carrying and supply aircraft must be available throughout the operation; and that, if possible, the dropping zones should be within range of friendly fighters.

Perhaps the first is the most important of all. Glider trains and troop-carrying aircraft are very vulnerable to fighter attack, and unless they can be guaranteed immunity from such attacks, either by the use of overwhelming fighter cover or, preferably, by beating down the air opposition in advance, an airborne invasion involving a deep penetration of enemy territory clearly cannot be undertaken in view of the crippling losses which would be suffered. The attacking side must not only enjoy air superiority during the initial landings but throughout the operation, for without it the air bridgehead seized would be open to constant bombings and dive-bombing assault. The Germans could not have invaded Crete by air had not the tiny RAF fighter force first been destroyed or driven out by sustained bombing. From every other point of view Malta was equally as suitable as Crete for an airborne invasion, but it was never attempted because the enemy failed to win command of the air over the island. It is no mere accident that the Germans are now using parachute troops as ordinary infantry; they fully realize that they cannot again be employed in their proper role, because the Luftwaffe has been defeated.

Favorable flying weather is essential throughout an airborne operation. Just as accuracy and concentration are golden rules for bombing attacks, so they are for airborne landings. The first "lift" of parachutists and glider troops must be landed exactly at the prearranged points, and for that the tug aircraft crews and glider pilots must have good visibility. Although scientific aids can be used to guide subsequent arrivals, these are not an adequate substitute for a visual identification of the dropping zones. If bad weather intervenes after an airborne landing has started, it not only prevents reinforcements being thrown into the battle but gives the enemy a chance of wiping out the limited number of troops already landed, moving into the landing zones adequate forces to destroy reinforcements as they arrive, and to install antiaircraft guns, which can take heavy toll of tugs, gliders, troop-carrying aircraft, and the unarmed supply machines. From all of this it follows that surprise is one of the most important prerequisites for success in an airborne attack.

Something like 1,000 aircraft are needed to take an airborne division into action. In planning a very large-scale invasion, therefore, one of the problems is to be certain that an adequate number of the right types of airplanes are available. Some tugs, troop-carriers, and resupply aircraft will be able to make two or more journeys, but some will

inevitably be lost, while in a protracted operation the question of serviceability will arise. To estimate beforehand exactly the number of airplanes which will be needed is not as simple as it may seem, for there are so many unknown factors, such as the rate of casualties and the duration of the operation.

Perhaps in no type of land action is meticulous planning so necessary as for an airborne attack. To begin with, the thousands of troops involved are all men of high physical and mental qualifications who have received special training, and whom it is not easy to replace. The equipment used is very expensive, and even if all goes reasonably well the cost in gliders and aircraft alone will not be insignificant. Unlike an ordinary land attack, an airborne assault, once started, cannot be abandoned, because too much is at stake; nor can alternative landing zones be selected if things go badly, because concentration of strength is vital.

Even though light tanks, artillery, jeeps, and other heavy equipment can be carried in the British Hamilcar glider, it is almost certain that airborne troops fighting well inside enemy territory will have to face superior fire power. It is also obvious that the enemy, possessing short land communications, will be able to build up their strength more quickly and easily than opponents who have to carry every man and every item of equipment hundreds of miles from another country. That is why airborne troops can only be expected to hold out for a limited period, and why dropping zones must be in positions which the main body of troops can be expected to reach within a period of time which can be estimated with reasonable accuracy. Fighting in their own territory, there are other advantages which the enemy will probably enjoy, but as in Normandy and at Arnhem these can be offset for a time by the superior fighting qualities of the airborne troops.

The employment of airborne troops has certainly done much to bring about a deeper understanding between land and air forces. The fighter pilot or bomber crew are not exposed to the same kind of risks as the soldier on the battlefield, but the crew of the tug aircraft and the pilot and troops in the glider he is towing along behind him share a common danger while they are in the air; the same applies to the crew of the troop-carrier and their "passengers." During their training period, parachute and glider troops mix freely with the men on the RAF station from which they fly, and commissioned glider pilots and RAF aircrews share the same messes. In this way they have come to understand something of each other's work and difficulties. The normal glider pilot (who is a soldier volunteer) is trained by the RAF, while the crews of the RAF group who work with the Airborne Army see something of the soldiers' preparatory training.

The decision to use surplus RAF pilots—one, incidentally, which came about through the welcome fact that air losses have been smaller than anticipated—will add to that dual understanding and sympathy. Glider pilots must not only be able to fly the glider which takes their colleagues into action but, once it has landed, they must transform themselves instantly from pilot to soldier and be able to play their full part in the fighting. By the time they are ready to go into action, these men have acquired a unique knowledge and understanding of the work of both land and air forces—something which can be of tremendous value now that the need for the closest possible integration of the two services is throughly appreciated.

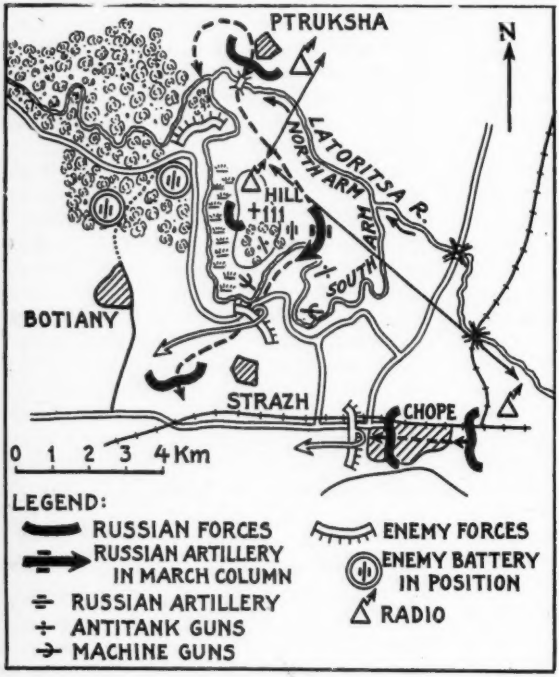
A Difficult River-Crossing Operation

Translated at the Command and General Staff School from a Russian article by Major N. Zaprivodin in *Krasnaia Zvezda* (Red Star) 4 January 1945.

A bold and rapid turning movement is one of the most effective tactical maneuvers used in offensive operations. The use of this maneuver depends on certain elements of the situation and particularly on the terrain. The ability to overcome difficulties as they arise

and to execute a decisive maneuver under difficult terrain conditions denotes a high degree of combat skill on the part of the attacking troops.

The operations of the Nth Infantry Division are instructive in this regard. As a result of fall and winter rains all rivers had overflowed their banks, and the lowlands with their swampy, clayish soils were covered with water. As a result, these rivers had become difficult water barriers.



Another peculiarity of this area is its poorly developed net of improved roads, and only improved roads could be used for the movement of supply trains and artillery. To make matters worse, the retreating enemy had destroyed bridges and dikes, had mined detours and fords, and his artillery had prepared firing data for all probable crossing points.

Taking advantage of all these favorable conditions, the enemy had fortified the village of Chope (see sketch) and resisted stubbornly. In this situation the division commander decided to undertake a turning maneuver. One of the regiments was given the mission of forcing the Latoritsa River near the confluence of its two arms (two kilometers southwest of Ptruksha). It was then to reach a point west of Strazh (four kilometers west of Chope) and attack the flank and rear of the defending enemy.

The detailed study of the terrain had shown that the crossing of the Latoritsa River in this sector would be very difficult. The swollen river had inundated the opposite bank, and a thick forest, now under water, interfered with the crossing. A pneumatic boat with a group of sapper-scouts could hardly pass through the flooded trees.

Only the infantry would be able to overcome the water barrier, and this not without great difficulty. To cross the artillery, we needed another sector with less swampy approaches. This meant that during the crossing the artillery would be separated from the infantry and unable to use its fire for clearing the bridgehead and supporting the infantry on the opposite bank.

Using the data supplied by the scouts and having considered the whole situation, the commander chose another sector which was more favorable for the forcing of the river. While continuing the first crossing as a feint, the infantry and artillery crossed without hindrance the north arm of the Latoritsa River in the vicinity of Ptruksha and reached Hill 111 (see sketch). The south arm was to be crossed about one kilometer southeast of this hill.

Here the approaches to the river were more convenient. A thick growth of shrubs and trees along the bank would enable the artillerymen and machine-gun crews to oc-

cupy their firing positions unnoticed by the enemy. The main advantage of the new crossing point was the fact that the river at this point curved toward our troops. The area on the opposite bank was suitable for a bridgehead, for it could be easily cleared of the enemy and then covered from both flanks by the fire of the artillery and heavy machine guns. The artillery and machine guns were to cross the river only after the infantry had established a bridgehead.

The enemy, alerted by the attempt of our units to cross the Latoritsa River at the confluence of its two arms, transferred to this area an infantry battalion with four guns. He was sure that we would undertake the crossing at that point in order to exploit the concealment offered by the woods. He thought, also, that we would concentrate our forces north of Botiany and then hurry to the rear of his troops defending Chope. For this reason, preparations for the crossing, which had begun at dawn, passed unnoticed by the Germans. Only after almost the entire infantry and part of the guns and machine guns had reached the opposite bank did the enemy, using two companies, counterattack one of our small units approaching the dike. But the artillery which had been brought up to the right bank frustrated this counterattack.

Continuing its advance, the regiment reached the railroad one kilometer south of Strazh. The enemy troops defending Chope were now threatened with encirclement. This forced them to abandon their position and retire hastily to the southwest.

This favorable moment was immediately exploited by another unit advancing toward Chope from the east. It broke into the village on the heels of the withdrawing enemy. Pressing him to the west, our guardsmen drove the enemy under the flanking fire and into mobile ambushes of our unit which had broken into the area of Strazh. This unit destroyed about 1,000 Hungarian men and officers and took 400 prisoners. This successful action was the result of a skilful and rapid maneuver carried out under difficult conditions.

The reconnaissance methods used during this operation were somewhat unusual. As shown on the sketch, our units were separated and advanced at a considerable distance from each other. In order to provide both units with continuous information of the enemy, the reconnaissance post was established near Hill 111. From here it reported the results of its observation by radio to the cooperating units and to the higher staff.

The Medium Bombers

Digested at the Command and General Staff School from an article by Charles Graves in *The Sphere* (Great Britain) 24 February 1945.

In the new offensive, as well as from D-day up to the Ardennes breakthrough, the accuracy of the medium bombers—Mitchells, Mosquitoes, and Bostons—has been a godsend to the Army. The truth of the matter is that fighter-bombers are a wonderful instrument against certain targets such as communications and isolated motor transport when using their cannons; similarly, rocket-firing Typhoons are grand against tanks, but their usefulness as bombers is far less. They simply do not, and cannot, have the accuracy or the weight of mediums, which fly straight and level on their run-in instead of diving down steeply, releasing their bombs, and climbing straight again. From December 1943 to May 1944 a group of mediums flew nearly 5,000 sorties at a cost of forty-one aircraft and 120 aircrew. During that period they suspended forty-five percent of the V-1 sites destroyed.

Targets about 500 yards in diameter are ideal for aircraft like Mitchells and Bostons. They can neutralize them completely without causing the huge craters created by heavy bombers. What is more, they are so precise

that they can drop their load within 500 yards of our infantry, compared with the very much greater safety zone necessary when heavies go on the same kind of job. Bombing by mediums is an almost instantaneous affair. The aircraft fly in multiples of six, and all drop their load simultaneously on the order of the "box" leader. To do this effectively, of course, they have to fly in very close formation—wing-tip to wing-tip. The actual bombs are nearly always 500-pounders or 1,000-pounders, and can destroy the enemy when dug into positions which are practically invulnerable to shell-fire and rockets.

Another advantage of the Bostons, Mosquitoes, and Mitchells is that they can be diverted—when already airborne—from one target to another, as opportunity arises. A perfect example of this was during the Falaise Gap period, when a number of mediums were diverted to Rouen on enemy transport. Apart from the 1,400 vehicles destroyed and the German troops blown to bits, over 6,000 Germans were buried as a result of this devastating attack.

Mediums usually fly at more than 7,000 feet, which is the limit of German light flak, and at less than 17,000 feet. Taking the average as being 10,000 feet, here is a fascinating series of statistics showing how the slightest error can cause bombs to go astray. If the aircraft is flying at, let us say, 250 miles per hour, a two-degree tilt of the Mitchell's right wing will cause the bombs to fall 111 yards to the left; if the Mitchell's nose is pointing two degrees too high or too low, the bombs will drop 200 yards too far ahead or too short of the target; if the aircraft is flying five miles an hour slower or faster than it should, the bombs will fall sixty yards short or beyond the target. Those are all errors of the pilot. Apart from this there is the possibility of errors caused by instruments, temperature, and computation, as well as by an incorrect adjustment of the bombsight. The present type, incidentally, is much handier and more foolproof than any other sight in the world, bar none; otherwise it would have been impossible to flatten the steel works at Caen without injuring our troops held up 500 yards away, or to destroy three vital bridges during the breakthrough, in spite of the weather being trickly and in one case, ten-tenths cloud.

The low-level Mosquitoes are no less accurate, although they use an entirely different technique without a bombsight. Flying low and straight at the target, the pilot releases the bombs just as he pulls up over the objective, "firing from the hip," as it were.

The mediums naturally have casualties, like anyone else out here on the Continent. A formation of mediums had no fewer than twenty-seven aircraft damaged by flak on a single sortie. On the other hand, only one failed to return. Mitchells are sturdy aircraft and carry a 4,000-pound bomb load. Bostons and Mosquitoes carry half this weight; the latter usually attack at zero feet, which makes accurate navigation absolutely vital. Identification of the target is equally essential, and to achieve this a special model-making department under the control of a former architect is always hard at work coordinating information from maps, stereophotographs, and special "Gen" from intelligence, and then reproducing it in cardboard contour layers on a boxboard, the contour lines being enlarged from the map by optical projection. The "steps" between the cardboard contour layers are modelled in a mixture of lavatory paper, plaster of Paris, and size (glue), which is nicknamed "jollop," thus giving a scale representation of the actual land surface.

An alternative method is to use sheets of wax for the contour layers. These are built up and welded together with hot irons, after which the "steps" are scraped down. From this original, a plaster mould is made, copies of which can be made in the form of plaster casts. The next stage is surface detail, which is plotted by the application of a photographic "skin"—in other words, a vertical air photograph enlarged to the scale of the model. This "skin" is pasted on to the land form and stained with ap-

propriate ground color, after which the roads and railways are painted on. The final process is the application of topographical detail carefully made to scale and based on stereo photographs. Heights are calculated by using the shadow factor, which gives the ratio between heights of objects (such as houses) and the length of their shadows according to the position of the sun at the time the photograph is taken. This has to be exceedingly accurate when the target is in a built-up area, and it seems incredible that photographic interpreters can tell the height of a house to a matter of inches from a photograph taken at a height of 20,000 feet or more. As it is, the accuracy is so great that when the representation of the houses and trees (represented in wood, plaster, linoleum, or colored sawdust) has been added to the model, the RAF officer briefing the aircrews for the job can tell almost immediately which is the best line of approach to a single building in a large town which he has never seen in all his life. These models, incidentally, are done in units of two square feet.

Among the brilliant exploits of the mediums in the past few months were the wiping out of a panzer headquarters, the general and the whole of his staff being killed; the blanketing of petrol, oil, and lubrication dumps at Montreuil-Belfort; the destruction of the bridges at Roermond, Hedel, and Zutphen. They have supported not only the British and Canadian armies in their advance to the Rhine, but also the First and Ninth American Armies in the battle of the Ardennes. Actually, over 22,000 sorties were flown in the last six months of 1944 alone by one medium group.

This would, of course, be impossible if it were not for the ground crews. They are on their toes the whole time and reckon to be able to complete the "turn around" of a Mitchell bomber in two hours. The phrase is taken from the Road Passenger Transport Companies for an omnibus at the end of its run and before it starts back again. On one spectacular occasion a single wing of Mosquitoes has flown 105 sorties between dusk and dawn in harassing attacks on enemy night movement—probably a record for the number of aircraft to leave any airfield on night operations. When you consider the bomb load it seems scarcely possible, but one "box" of six aircraft actually flew four times in a single day, while others which had flown three times in daylight went up again at night.

Weather naturally cuts down flying time, but in spite of this, in one good spell, some aircrews have completed their tour and were duly screened (given a change from operations) in six weeks. Weather has always been, and continues to be, the bugbear of all flying personnel. It is felt in many circles that there is room for improvement in the application of the information, in the speed of the communications used, and in the presentation of the met [meteorological] picture to the people who fly. It may, in fact, be true to say that the science of meteorology has not quite kept in step with advances in other departments of aviation—for instance, the great progress in the ability to fly in bad weather, flying by the use of improved flying instruments inside the aircraft, and vastly better outside aids. Now that aircraft are able to fly in bad weather, much more exact forecasts are required. Which brings me to the point that the Allied High Command does not seem to conduct its strategy or tactics according to weather forecasts. This is in spite of the fact that the British have not won a single decisive battle without air support.

To revert, however, to the mediums, the weather is a very big factor with which to contend. Accuracy in hitting their target from heights of 10,000 feet and over as tactical operations is all the more important when vital areas have to be flattened exactly at the right moment for the infantry 500 yards away to rush in while the enemy are still dazed.

The Breaching of the Siegfried Line

Translated at the Command and General Staff School from a French article by Camille Rougeron in *Afrique en Guerre* (Dakar) 21 October 1944.

THE breaching of the Siegfried Line in the Aix-la-Chapelle [Aachen] sector proves once again the fragility of fortified lines in contrast with the capacity for resistance of so many other improvised defenses—lines of buried tanks, for instance, as in Normandy or the suburbs of Warsaw.

Contact having been established with the line, it was on 13 September that the first of the weapon emplacements was taken—if we may accept the word of the DNB [*Deutsche Nachrichtenbüro*—German Information Bureau]. The Allied communiqué of the 14th mentions the bombardment of the emplacements by attack bombers. By the 15th, seventy-five weapon emplacements had been taken. On the 16th, the line was breached.

The fragility of these fortified lines, which the military authorities of each particular country had pointed to as impenetrable for the reason that they had added to the continuous lines of 1914-1918 the resources of permanent fortification, was demonstrated at Leningrad during the course of the winter of 1939-1940. At first the Mannerheim Line repelled all Soviet attacks. But once the breakthrough tactics had been worked out, concrete weapon emplacements fell by the hundreds during the course of a single day.

Since that time not a single line has held, neither the Maginot Line nor the Stalin Line, nor the line which duplicated the latter in the vicinity of the new frontier of 1939, nor the Metaxas Line in Greece, nor any of the numerous lines which the Wehrmacht attempted to hold during the two years of its retreat in Africa, in the USSR, in Italy, and of late on the Atlantic and Mediterranean coasts. But it is well that proof of this has been made again, and this time by means of the most famous line of them all, the one where German youth had worked for years to construct a rampart that would be impenetrable. Its tens of thousands of concrete bunkers proved no greater obstacle, apparently, than the electric power plants and underground passages that had been the objects of wonderment to visitors to the Maginot Line.

The methods by which the breach was effected—according to the rather limited information it has been possible to release—presented no features that were not already known. They were exactly the same as those employed five years ago by the Red Army.

It is probable that there was no scarcity of air bombing. But if we are to judge by the type of planes used, it was unnecessary to employ 12,000-pound bombs—which attack bombers would have been unable to carry. It even seems fairly odd to see this type of plane suffice for the Siegfried Line when American and British four-motored bombers are dropping thousands of tons of bombs at the same time to reduce the defenses of fortified cities.

Medium-weight bombs sufficed, therefore, not only for the elimination of antitank ditches and "dragon's teeth," but also for knocking out the bunkers and forts of the Siegfried Line. It is quite certain that smoke was employed with the same profusion as the bombs. The infantry and tanks passed through afterwards without encountering any obstacles. The main difficulty was, likely, the same as exists outside of fortified lines—the repelling of the counterattack. That is undoubtedly the way the command had expected the operations to turn out—as was stated by them after the breach had been effected. The counterattack, it is affirmed, was the most formidable the Allies had been called on to sustain so far in the Battle of France. The Wehrmacht called even for the assistance of the last few planes of the Luftwaffe, which are kept in reserve for major emergencies. But neither their tanks nor their planes were able to repel the American army. The only thing they won by their fruitless counterattack was additional heavy casualtes on their part. Were these counterattacks entirely useless, then?

They were not, for they temporarily halted the impetuous lunge of the Americans through the breach, a lunge which proved to be the decisive element in the Battle of France when it pierced the German lines at Cotentin.

Thus, in view of the fragility of a fortified line, which can be breached in the course of two days' time, the capacity for resistance of an army in open terrain, pouring through this fortified line with nothing with which to repel counterattacks but its tanks, its tank-destroyers, and its planes, is quite worthy of note. Nothing can better demonstrate the vanity of hopes based on concrete.

Analysis shows very clearly the superiority of improvised defenses. For his penetration of the Siegfried Line, General Eisenhower had one or two weeks' time at his disposal in which to prepare. He was provided with all the photographs he desired of the antitank ditches and bunkers his troops had to overcome, photographs in which not a fortified work was missing. The aviators had learned by heart the details of their sketches. It is not likely that many bombs were wasted. And after all this preparation, the American troops found themselves facing the scanty forces the enemy command had been able to place at the chosen point.

The task of Marshal von Rundstedt was a much more difficult one. He had to bring his reserves into line under a hail of Allied bombs. The German tanks and planes found themselves faced not with forts several meters in height but with the turrets of tanks peeping over the rim of explosion craters and hastening to shift their positions as soon as the enemy appeared to have spotted them. The German troops were not dealing with parsimonious dispositions of enemy forces but with a concentration of American assault divisions supported by artillery and aviation in all the mass that could be desired. How could a counterattack have succeeded under such circumstances? We should be in the wrong if we saw, in the superiority evident in this improvised defense as compared with defense based on permanent installations, a feature peculiar to the military situation of this, the final phase of the conflict. Matters worked out in the same way in 1914-1918. The only battles that took place at that time in the midst of a fortified region were those about Verdun. The thing that constituted the main resistance at Verdun was not the forts of the outer belt of defense—Douaumont or Vaux, which alone had been reinforced by means of concrete. If one has a liking for paradoxes, he may maintain that it was the forts of the ancient zone such as Souville that were built for resisting the attack methods of 1870. As a matter of fact, neither of these permanent works played an important role in the defense of the city. If the German attack was stopped between Douaumont and Vaux in the one instance and at Souville in the other, it was because the French army resolutely determined to bar the way, not with the help of a network of trenches that had long since been demolished by the enemy's heavy artillery, but with the help of simple machine-gun emplacements in shell craters.

There were discovered at that time, also, excellent reasons with which to explain the failure of permanent fortifications as compared with field fortifications—even the most perfect types of the former in comparison with the most primitive types of the latter. When, at Verdun, Ludendorff forbade the employment or construction of the ancient type of double-entrance, underground shelters for the protection of personnel, it was because experience had shown him that he was losing infantry by their not having time to emerge from these shelters when an attack occurred. His total losses were less when his men remained outside the shelters. Likewise, shell craters proved to be far superior as machine-gun emplacements to those constructed especially for this purpose. They could be abandoned and others used, for there was any number of them to choose from.

Today, the Siegfried Line is breached in two days' time. But the infantry and tanks resist all subsequent counterattacks, as they have not had time for the pouring of con-

crete. Twenty-eight years later, the machine gun in the shell crater that saved Verdun has become the tank, half buried behind the rim of a 500-kilogram bomb crater.

River Flotilla Operations on the Berezina

Translated and digested at the Command and General Staff School from a Russian article by Commander V. Fedotov in *Krasnyi Flot* (Red Fleet) 29 November 1944.

THE following situation prevailed in the Berezina sector of the First White-Russian Army Group in the middle of June 1944. The enemy's position was along the line Rakshin—Zdudichi—Zaluchie—Mormal. During several months of its occupation the Germans had improved it considerably. Continuous deep trenches stretched along the entire line. There were several rows of trenches reinforced by wire entanglements and mine fields. Besides, all the settlements along the bank of the river had been transformed into centers of resistance.

The village of Parichi (see sketch), for example, had an all-around and echeloned defense. The village of Zdudichi had, in addition, formidable obstacles on the bank and two booms reinforced by mines in the river. The obstacles consisted of mined barbed-wire entanglements in the water, and of trenches, barbed-wire entanglements, and land mines on the bank. The booms were built in the following manner. Several rafts made of thick logs were tied together with cables, and all the rafts were anchored and tied, in addition, to a steel cable stretching across the river and fastened to the banks. The top of the structure was covered by the spiral-wire obstacles and had mines with pull-type detonators. The booms were covered by machine-gun and small-caliber artillery fires.

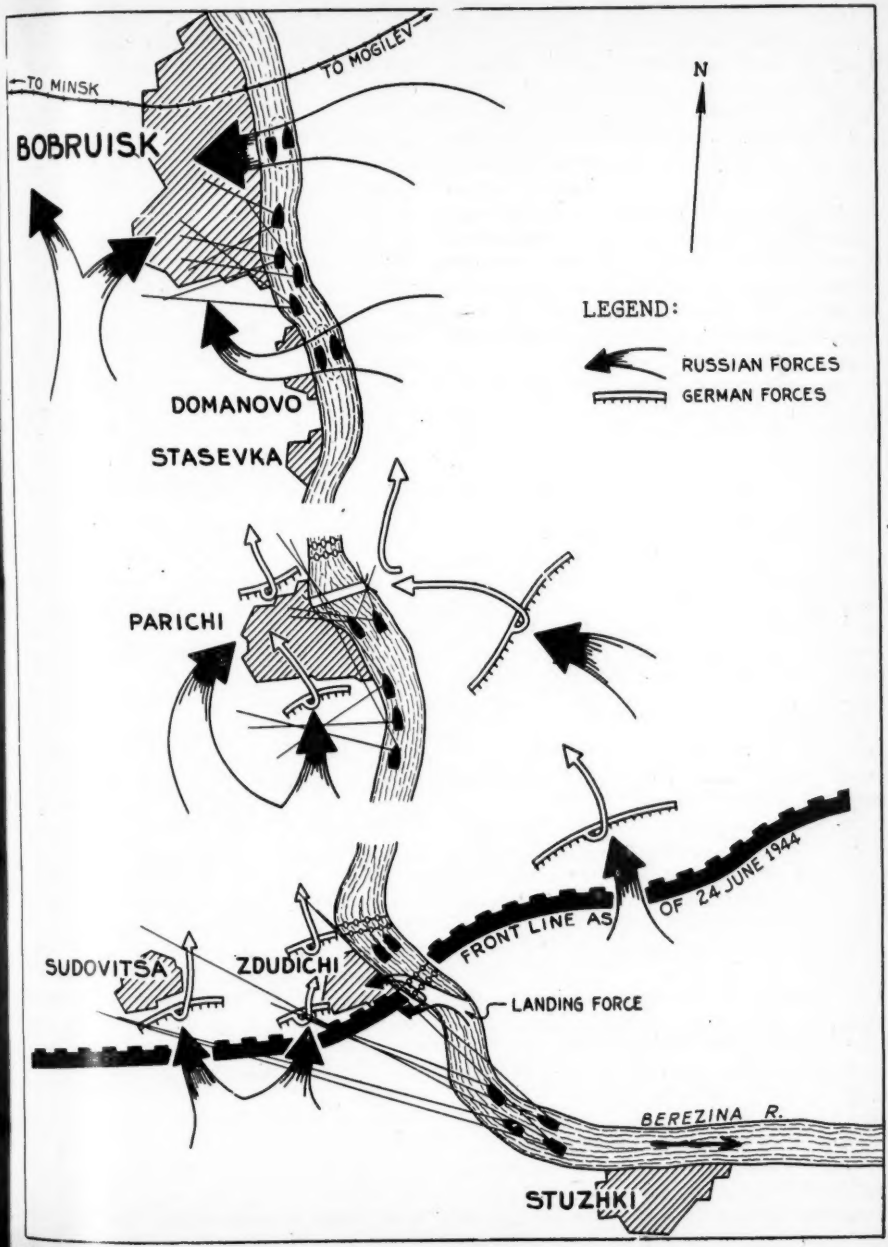
To this should be added the natural navigation difficulties on the Berezina River: its winding course, its shallowness, and its lack of navigation facilities. For several years the river had been neglected in this respect.

The Red Army units in this sector were given the following mission: on the right bank, to breach the German defense between Sudovitsa—Zdudichi and attack in the direction of Parichi; on the left bank, to break through and to support the general offensive along this bank in the direction of Bobruisk.

The ships of the Red Banner Dnieper River Flotilla were to cooperate with the army units and support their advance by artillery fire and landing operations. There were three stages in the operation of the flotilla. The first was the landing operation and artillery support of troops in order to capture Zdudichi; the second, the advance of the ships up the river, the destruction of the enemy crossing in the vicinity of Parichi, and support of the troops in capturing this stronghold; the third, reconnaissance in force in the sector of the city of Bobruisk, the transfer of the Red Army units from the left to the right bank of the river, and the participation in the storming of the city of Bobruisk.

The offensive began on 24 June. At dawn, the ships and the ground units took part in the artillery preparation preceding the breakthrough operations in the sector Sudovitsa—Zdudichi. The ground troops command had informed the ships of the most important targets, such as artillery and mortar batteries, machine-gun nests, observation posts, and field and permanent fortifications. Artillery observers from the ships were stationed among the ground troops. Being only 300 meters from the main line of resistance, they were of great help in conducting fires.

All known targets were neutralized, and the troops went forward. On the whole, the advance developed successfully. The units operating near the river, however, met strong resistance and were somewhat delayed. The flotilla was then given the mission of bringing a landing party to the southeastern


TO MINSK
TO MOGILEV
BOBRUISK
N
LEGEND:
RUSSIAN FORCES
GERMAN FORCES
DOMANOVO
STASEVKA
PARICHI
FRONT LINE AS OF 24 JUNE 1944
SUDOVITSA
ZDUDICHI
LANDING FORCE
BEREZINA R.
STUZHKI

outskirts of Zdudichi and of overcoming the enemy's resistance by a flank attack.

On 25 June at 2000 hours, the ships of Captain Peskov with the first group of the landing party broke through strong enemy fire, approached the outskirts of Zdudichi, and disembarked the landing troops. Supported by the fire of the armored cutters, the landing party pushed the enemy back and occupied three trench lines. Taking advantage of a moment when the attention of the enemy was diverted to some other objective, the trawlers destroyed the first boom obstacle. This enabled the armored cutters to advance farther up the river and to land the second group of troops in the immediate vicinity of the village. This group attacked the enemy not only from the flank but also from the rear, while the armored cutters now reached the enemy's rear and opened point-blank fire on his troops.

On 26 June at dawn, the Red Army units supported by the landing force and the ships' fire, launched an assault on Zdudichi. The Germans, taken under strong concentrated fire and fearing encirclement, started withdrawing in the direction of Parichi. Our troops captured Zdudichi and continued the pursuit of the enemy, with the ships following the advancing ground troops. Upon requests of our ground commanders, the ships' artillery destroyed targets interfering with the advance of our infantry.

During the assault on Zdudichi, the trawlers, protected by specially detailed armored cutters, broke through to a point north of the village and blew up the other boom which was about two miles north of Zdudichi. This enabled the bulk of the flotilla to steam up the river.

As a result of the rapid advance of our units, the enemy group withdrawing along the left bank was pressed to the river and threatened with complete annihilation. In order to avoid this, the Germans feverishly began moving their men and matériel to the right bank. There was, also, another reason for this maneuver. Bobruisk is located on the right bank of the Berezina, and Parichi, Stasevka, Domanovo, and other villages on the way to Bobruisk were formidable centers of resistance. By reinforcing them with their left-bank troops, the Germans expected to stem our advance.

However, the enemy did not quite succeed in getting his troops across the river. The ships of Captain Lialko noticed the German crossing at Parichi and took them under fire at 400 meters. The enemy responded by opening fire not only from the guns covering the crossing but also from the tanks and self-propelled guns approaching the crossing point. The ships were forced to use the method of repeated approaches in which three or four armored cutters participated. They did not cease firing until the Germans had discontinued crossing and had begun withdrawing along the left bank toward the crossing points near Bobruisk. After violent fighting, Parichi was cleared of the German troops.

The advance on Bobruisk continued at a very rapid tempo. To avoid lagging behind the attacking units and to maintain contact with them, the ships continued to fight their way up the river. They overcame two more mined booms and fought scattered enemy groups left in the rear of our troops.

In the evening of 27 June, the ships reached the southeastern outskirts of the city of Bobruisk and participated in the artillery preparation preceding the assault on the city. By that time, the troops of the First White-Russian Army Group had completed the encirclement of the German IXth Army, and had begun the liquidation of the encircled enemy troops. First, these troops were split into two parts, one of which was isolated in Bobruisk proper and the other, southeast of the city. This was followed by wedging into the German defense in various sectors, splitting it up, and destroying enemy manpower and matériel. The ships helped the troops in the accomplishment of this mission.

During the day, 28 June, in order to get information on the situation in the city and the condition of the railroad bridges and crossings, the armored cutters of Captain Peskov twice penetrated the city limits

under enemy fire. At a distance of from 300 to 400 meters, they strafed the enemy troops crossing the river and while doing so obtained valuable information about the situation.

The Red Army units advancing from Zhlobin in the direction of Bobruisk routed the German forces in the triangle Zhlobin—Shatsilki—Bobruisk, and reached the Berezina River near Stasevka—Domanovo. They had to force the Berezina River immediately, for most of our troops pursuing the enemy along the right bank were then advancing to the west on the heels of the retreating Germans who had escaped the Bobruisk trap. Serious difficulties were encountered in the crossing.

Before the arrival of the ponton units, the transfer of troops to the other bank in the sector Stasevka—Domanovo was carried out by the ships of the river flotilla. Patrol cutters, trawlers, auxiliary vessels, and captured barges participated in this operation. Within a short time, tens of thousands of men with arms and equipment were ferried across.

Now our troops moved toward Bobruisk along the right bank. The ships covered their flank. At dawn on 29 June the flotilla broke into the port and began neutralizing enemy fire emplacements and landing separate assault groups.

By the beginning of the assault on the city of Bobruisk, the troops advancing along the left bank had also reached the city. The railroad bridge was destroyed and they were ferried to the city side of the river by armored cutters under enemy fire. No other vessels could be utilized for this operation because they had no protective armor.

On 29 June the troops of the First White-Russian Army Group in cooperation with the river flotilla broke the resistance of the encircled German troops and stormed and captured Bobruisk.

After the liberation of the city, the ships could not move up the river because the railroad bridge, when it was blown up, had fallen into the river and obstructed the waterway. Further activity of the ships was confined to ferrying the troops.

The action described above was the first operation carried out by the troops of this Army Group in cooperation with a river flotilla. Through it the staffs and command personnel of both the flotilla and the ground troops acquired experience in various types of cooperation.

Combat operations of the river flotilla included artillery support in breakthrough operations, transporting landing parties, disrupting enemy crossings, and ferrying our troops across the river. All this contributed to the general success of our advance and to the destruction of the encircled enemy troops.

Despite the difficult navigation conditions and strong enemy fire, the ships did not lag behind the rapidly advancing ground troops. Throughout the whole operation the river ships maintained contact with the ground forces and accomplished all missions assigned to them.

Volcano Bomb

From a British source.

THE British 22,000-pound bomb is the most destructive weapon of war yet invented. It is ten times as powerful as the Nazi 3,000-mile-an-hour V-2 rocket and, unlike that weapon of blind destruction, it is highly accurate. If it were not for this accuracy the new bomb would be of little value, for it has been designed to destroy difficult pinpoint targets, not to cause a widespread area of devastation.

The whole purpose of this bomb, latest in the blockbuster-earthquake series of British bombs all designed for some specific job, is to smash targets hitherto regarded as indestructible. Such a target was the massive Bielefeld viaduct in Germany on which

the bomb was used for the first time. At least six spans of the viaduct crumpled up as the 22,000-pounders hit it.

Underground factories, U-boat pens, and fortifications of unusual strength are other natural targets for the new weapon, the strength of which lies in its combination of penetrating power and explosive force. For months the Americans were held up in their advance towards the Rhine by the famous Roer Dams, and every type of bomb then in use by the RAF was tried out on them without success. The dams held. Had the 22,000-pounder been in use at that time it might possibly have breached the dams, for it is nearly twice as powerful as its nearest counterpart, the six-ton "Earthquake" bomb that was used to sink the *Tirpitz*. Without doubt Bomber Command has a list of similar targets, regarded until now as impregnable, on which the new weapon, already named the "Volcano" bomb, will be tried.

The development of a new bomb like this involves much more than merely doubling the size of the previous one in the series. Neville Wallis, its inventor, has been working on it for five years. When he drew up his first plans, the Air Ministry told him that there was little likelihood of their having an aircraft powerful enough to lift it for years to come. He continued to work on it, however, and at the same time perfected the six-ton "Earthquake" bomb, which presented many of the same problems.

Experimental trials were carried out with scale models which were dropped from airplanes and given wind-tunnel tests. One model was actually fired from a gun at a velocity calculated to be the same as that at which it would strike the ground when dropped from an operational height. Then a full-sized case was made and filled with ballast. This was dropped at an experimental station in Britain, and it took eighteen men, working twelve hours a day, nine days to dig it out again. The test verified previous calculations. A real bomb was then made and this was dropped on a small granite island off the British coast. The island was blasted out of existence, and the Ordnance Survey Department were informed that they could leave it off their maps in future. A final test was made in southern England where the bomb was dropped on ordinary soil. Observers who stood a mile and a half away saw clumps of earth weighing ten tons hurled into the air. All together many thousands of tons of earth were displaced, and subterranean explosions produced by gas trapped in the earth continued long after the main explosion.

Those tests proved that the bomb would do everything its inventor had hoped, but there was still the problem of getting an aircraft to carry it. By various ingenious devices it had been fitted to a Lancaster for purposes of the experiments, but before it could be carried to the Continent under operational conditions, with full crew, petrol, and ammunition aboard, the bomb had to undergo many more modifications. A new bomb trolley was designed and a special hoisting tackle manufactured. Even then it took six men half an hour to get the bomb into position in the plane. When the original Lancaster started its bombing career, it had an all-up weight of 60,000 pounds. What it weighs now with the 22,000-pound bomb on board is a secret, but it is certainly the undisputed weight-lifting champion of the bomber world.

The new bomb is all-British in concept and development, and the first ones to be used were entirely made in Britain. Now that tests and actual use have proved its worth, some of the cases are being manufactured in America to British specifications. The English Steel Corporation in Sheffield cast the first bomb cases and helped supervise the metallurgical side of the problems encountered. The dangerous work of filling the monsters was done entirely by British labor in both the experimental and production stages. It was done so secretly that workers in other departments of the factory did not know they were working on top of a "Volcano."

Exact details as to the performance of the new bomb, such as the actual size of the crater it makes and its powers of pen-

etration, must remain a secret. Almost certainly it will find its way to the Pacific and there is no point in telling the Japanese how thick they must build their concrete fortifications or how deep they must bury their underground factories in order to obtain immunity. At the moment, the U.S. AAF has no operational bomber adapted to carry any of the bigger British bombs, either in the European theater or the Pacific. Whether the "Volcano" is eventually carried to Japan by Lancasters or by modified B-29's, the news of its existence must be giving the Japs much food for thought.

Modern Tank Battle

Translated and digested at the Command and General Staff School from a Russian article by Colonel P. Kolomeitsev in *Krasnaia Zvezda* (Red Star) 8 December 1944.

THE purpose of this article is to analyze the changes which have taken place in our tank tactics during this war.

In the last three and a half years, light combat vehicles have almost disappeared from the tank unit, having been supplanted by medium and heavy tanks equipped with thick armor and powerful guns. The light tank has not passed the severe test of the battlefield. Although its weakness—thin armor—was well known before the war, its continued use was justified by the belief that this weakness would be offset by the mass employment of light tanks and their high mobility. But neither their numbers, nor their speed saved them from the devastating fire of antitank weapons.

One of the arguments advanced against the medium and heavy tanks was based on the assumption that such tanks would affect the mobility of tank units. Soviet engineers, however, managed to design a tank which combined a relatively light weight and low silhouette on the one hand with a powerful armor and high mobility on the other. Our T-34, while not inferior to the light tank in tactical mobility, possesses much thicker armor and much more powerful armament. It is an ideal combat vehicle of its type. Its improved model is still used in combat.

Inasmuch as no armor plate can secure absolute protection, the trend toward the heavier armor should be regarded as an attempt to counteract the antitank weapons used en masse, i.e., small and medium-caliber artillery and antitank rifles. As soon as the Red Army started using medium and heavy tanks on a large scale, the Germans were forced to equip their antitank artillery with large-caliber guns (75-mm and 88-mm). These guns, constituting as they did a serious menace to our tanks, were less numerous than the small-caliber pieces. It should be noted that the Red Army had no particular trouble fighting heavy enemy machines, because this was done by our entire artillery, and its superiority (quantitative as well as qualitative) over the German artillery is beyond question.

The strengthening of the armor has considerably increased the vitality of the tank on the battlefield. The thickness of the tank armor is now measured in tens and even hundreds of millimeters, but the contest between the armor and the shell still continues, and it is difficult to predict its final results. The fire power of the tank has been immeasurably increased during the war. Our tanks are now equipped with long-barreled 76-mm, 85-mm, and even larger-caliber guns. There are several reasons for the ever-increasing caliber of the tank gun, and the main reason is the ever-increasing thickness of the armor, for each tank should be equipped with a gun the shell of which can pierce the armor of any tank—medium or heavy—at the longest possible range. A combat vehicle with a weak weapon will hardly have the independence of action so necessary in the modern battle.

It should be noted, by the way, that the armament of our tanks is by no means inferior to that of the German tanks, and that our T-34 gun can put out of commission

heavy Panthers and Tigers at a considerable distance. As to our new heavy tanks, they have a distinct superiority over the German tanks in fire power, range, and mobility.

Another reason for increasing the caliber of the tank artillery is the tendency to increase the "versatility" of the combat vehicle, i.e., its ability to accomplish a variety of missions. Tanks are backed by a powerful artillery support, but this does not obviate the necessity of firing upon weapon emplacements and targets located in trenches. Machine-gun fire for these targets is rather ineffective. What is really needed here is a 76-mm or 122-mm shell.

Such has been the trend of development of the tank during the war. Its combat power has been greatly increased, but not so much as to produce a radical change in tactics.

Heavier armor and weapons have produced certain changes in the firing methods and the movement of the tank on the battlefield. In this respect there are two opposite viewpoints. Some tacticians believe that the effectiveness of tank attack is determined by the speed of the movement and that accuracy of fire is not important. Others think that the tank affects the enemy by its fire and that movement is necessary only as long as it secures accuracy of fire.

The experience of this war has somewhat reduced the difference between these points of view. At first, there was a tendency to attack at low speed and halt for firing, which resulted in loss of mobility. But no matter how accurate its fire, the tank cannot engage the antitank artillery for any length of time. The fire of the latter will always be more accurate and, consequently, more effective. That is why the tank should depend upon its mobility. This is reflected in our tactics. We attack in a rapid tempo. The tanks approach the enemy at a maximum speed, firing as they move. Such firing cannot be accurate, but the idea is to approach the enemy as quickly as possible and break into his dispositions. This form of attack has been found perfectly justified from the tactical point of view provided it is launched *in force* and is thoroughly prepared, i.e., if the obstacles on the routes of advance have been removed and the enemy antitank means have been kept under the incessant and accurate fire of our artillery.

But it is futile to count upon the sheer psychological effect of a rapid tank attack. Combat experience shows that neutralization fires of the moving tanks should be combined with accurate destruction fires directed at the targets which interfere with the movement of the tanks. The latter is done by the self-propelled artillery. At the beginning of the tank attack, it displaces forward, occupies previously prepared positions, and destroys by accurate fire all antitank targets which have revealed themselves by their fire. As the attacking tanks advance, they are followed by the self-propelled guns. Firing through the gaps in tank formations or from the flanks, the self-propelled guns search out and destroy the targets endangering the tanks or those which are located beyond the range of the tanks. If self-propelled artillery is not available, this can be done by tanks manned by specially selected crews. They advance and halt for firing on enemy antitank weapons.

The methods of firing used by the attacking tanks may change depending upon the situation, but it will always be important to attack rapidly and energetically and to avoid "hanging around" on the same spot observed by the enemy.

As the tank armor thickens and fire power increases, firing from halts and from stationary positions becomes more and more important. Without such fires, no tank-versus-tank battle is possible. There was a time when tank engagements were thought to occur only sporadically. In the present war, however, they are quite frequent. For this reason, in any movement of our tanks, in marching or in attack, we should anticipate an encounter with the enemy tanks. What is meant here is both the battle formation and the readiness of all elements of the unit to engage the armored enemy. Consequently, the tank moves (maneuvers) only as much as is necessary to achieve fire superiority over the enemy. The role of heavy tanks and self-propelled

artillery is here paramount, and their armor and armament decide the issue.

It is characteristic that the fire fight between tanks is conducted at long ranges. Both sides keep at respectable distances from each other, attempting to take advantage of their fire superiority in range. If the shell of your gun can pierce the armor of the enemy tank at a distance of 1,000 meters while the maximum range of the enemy gun is 800 meters, it would be foolish of you to be within 800 meters of your target. To strike without being struck—this is the real meaning of fire superiority.

Such is the tactics of small units independently engaging enemy tanks in a fire fight. Operations of large tank units develop inevitably into battles with the participation of all arms and types of troops. In such battles, the role of tank maneuver is even more important. Frontal action is combined with turning maneuvers and with blows inflicted upon the enemy's flanks and rear. This, however, should not lead to any dispersion of forces. Only when the battle is almost won is it possible to shift to more decentralized forms of action.

These battles require a well established cooperation between tanks and artillery. The idea of cooperation is this: Enemy tanks are engaged by our self-propelled tank-destroyer artillery. It repulses attacks and counterattacks and interferes with the enemy's maneuvers. Taking advantage of this action, our tanks maneuver and attack the enemy from the most favorable directions. This is the ideal form of cooperation. In practice it may be different. Very frequently tank battles are started by tanks, and then other types of troops are drawn in. As the situation clears up, the division of missions among the various arms becomes more distinct and specific. If the battle becomes protracted, the main burden of fighting the enemy armor shifts to the artillery, while tank units are given missions requiring maneuver. The success of the battle is determined by the extent to which our tank troops have secured freedom of maneuver for themselves, and *have retained the ability to carry on the offensive.*

Experience shows that the outcome of a large tank battle is reflected without delay on the general course of the operation. The latter either peters out or develops in a faster tempo.

The numerical element in the present war—the war of motors—has acquired utmost importance. Modern tactics call for mass employment of tanks, which means concentration of tanks in the main direction, *for it is imperative to achieve absolute tank superiority over the enemy in the main, decisive direction.* All operations of our tank troops have been carried out with qualitative and quantitative superiority over the enemy.

Mass employment of tanks was known a long time ago, but only during this war has it assumed definite forms. Tank units are incorporated into large units, which, in addition to tanks, have artillery, motorized infantry, and other arms. Such units are endowed with great independence and a long range of action. There are also tank units which are attached to reinforce large units of all arms. All this has influenced the character of the modern tank battle.

Tanks are also used for close support of the infantry when both arms attack in "elbow-to-elbow" contact. Medium and heavy machines are best for this type of fighting. The tanks here play an important part. Close-support tanks advance according to a well worked out technique. Their mobility is somewhat affected, and decisive importance now attaches to the coordination of movement of the tanks and infantry, receiving powerful and uninterrupted support of the artillery.

Modern tactics do not call for splitting tank units engaged in close support of the infantry (except for breaching fortified lines). They are used in close formation in the direction of main effort of a large all-arm unit. As to the echelonment of tanks, this is determined by terrain, enemy defenses, and number and type of tanks. Generally speaking, echeloned formations are preferred since such formations increase the breaching power of tanks.

There is no need to examine all the details of cooperation among the close-support tanks,

infantry, artillery, and sappers. Suffice it to say that no essential changes have been introduced into the scheme of cooperation during this war and that the breakthrough operation for tanks is a difficult task requiring careful planning.

One of the difficult phases is the movement of tanks into the breakthrough and their action in the rear areas. Special attention should be given to the thorough clearing of the "corridor" for the introduction of the mobile groups. Experience shows that mobile groups often effect the breakthrough all by themselves. There is nothing unusual about this. But it is important that the tank units do not "get stuck" in the tactical zone of the defense, and that they avoid protracted engagements with the enemy. The loss in tempo may lead to the failure of the whole operation.

Despite their relative independence, the tank and mechanized units moving into the breakthrough gap need the support of other arms and, first of all, of aviation. This support should be powerful enough and should cover the entire depth of the attack. The deeper the tanks penetrate the enemy rear areas, the more air support they will need.

The nature and the direction of the maneuver of mobile groups are determined by combat missions. The main point here is sufficient flexibility and rapidity of the tank maneuver. The tanks should not be diverted to secondary tasks, but should reach the assigned objectives with maximum speed. "Forward, as fast as possible, forward!" This is the slogan of the tank and mechanized units employed in deep penetrations. Their operations create the prerequisites for the complete rout of the enemy.

In the end, the maneuver of the tank unit on the battlefield is secured by well coordinated operations of all types of troops, which pierce the enemy defense and secure the commitment of the tank unit into the gap and its further advance into the enemy's rear. The paramount principle of Soviet tank tactics, then, is *continuity of cooperation with other arms and full exploitation of their own mobility.*

Of all the forms of the employment of tanks in the present war, their shock power finds its fullest expression in mobile warfare. Possessing great fire power and operational range, the Soviet tank has manifested its remarkable ability in penetrating far into the enemy's rear and in dividing and encircling his forces. Our tank tactics have proved to be more elaborate, more flexible, and more effective than those of the Germans. The objective character of this statement has been confirmed by the course of events.

Albanian Mission

Digested at the Command and General Staff School from an article in *The Fighting Forces* (Great Britain) February 1945.

By the liberation of Tirana, capital of Albania, and of Durazzo, its principal port (see sketch), the work of the British officers and men who have been operating in Albania since April 1943 is crowned. Theirs is a story of courage and initiative displayed in the face of appalling conditions. It is a story of long, lonely months spent in the heart of an enemy-occupied country, of ceaseless work with Albanian partisans, to free their country from a desperate enemy.

Before the spring of 1942, information about the situation in Albania was scanty. Then it became known that the numerous guerrillas who had been fighting all over the country had reached some form of agreement to coordinate their activities against the enemy. Plans were therefore made in Cairo for a British military mission to go to Albania, contact resistance leaders, and develop operations.

After a year of planning and preparation, British officers were dropped by parachute in northern Epirus. They received a magnificent reception from the Greeks but were met with much suspicion on the border. It was

five weeks before they were able to cross the frontier. The Albanians were hospitable but suspicious. Some of the older peasants refused to believe that they were British.

They toured the country widely, making contacts with resistance movements and sympathizers of all parties, and they began to coordinate partisan operations and to supply the guerrillas with arms and ammunition.

The fruits of their efforts were soon apparent. Between 15 and 19 May 1943 the partisans carried out important operations in southern Albania, capturing large quantities of food and ammunition. An enemy column was ambushed on the Greek border. The Italians were forced to evacuate Lesovik and to abandon Perat bridge to the partisans.

On 30 June 1943 another Italian column was attacked and 200 killed. Encouraged by this success, the partisans began a fierce assault upon the garrisons of Permet and Kelcyre on 1 July, with the object of making the Italians feel so insecure that they would evacuate those towns, thus leaving all the main roads in the area in partisan hands.

As the battle developed, more and more armed peasants joined the partisans and several Italian columns were annihilated.

On 8 July the senior British officer arrived at Labinot, near Elbasan, after an adventurous journey. He attended an important meeting of guerrilla leaders at which the Central Council of Resistance was chosen and the *Levizja Nacional Clirimitrre* [LNC] consolidated as a political and military organization.

By the beginning of August there were several British missions working in Albania in close contact with the Partisan Central Council and helping to organize and train the 1st Partisan Brigade. The partisans were easy to teach and eager to learn. By the middle of August the brigade was adequately trained, armed, and equipped and ready to commence operations. It was commanded by Mehmet Shehu, an able and courageous soldier who had fought in the International Brigade during the Spanish Civil War. The Partisan Brigade was composed of four battalions and was well supplied with rifles, light mortars, and heavy and light machine guns.

As was to be expected, the fall of Mussolini stimulated Albanian resistance, and anti-

Italian demonstrations took place in many towns. In Tirana a number of Albanians were killed, but the Italians withdrew many troops from the town. On 6 August the Italians began to take drastic steps to quell the unrest. A threatening proclamation was is-

sued and before long the promised savagery was in full swing. In the Malakaster area alone seventy villages were burnt and 25,000 people rendered homeless. Throughout the whole of southwestern Albania, Axis troops left hardly a house standing. Nevertheless, resistance continued on a widespread scale.

On the first news of the Italian surrender to the Allies, strenuous efforts were made by the British military missions to contact the Italian commanders and induce them to take up arms against their former Allies. Attempts were made to get a message, through partisans in Tirana, to General Dalmazzo, commander of the 9th Italian Army, but the message failed to get through until 10 September, by which time the Germans were already in occupation of the capital. A British liaison officer, in uniform, then went to Tirana in an Italian staff car. He saw Dalmazzo's chief of staff, with whom he discussed plans for combined action against the Germans. The chief of staff agreed to a detailed plan on behalf of his general. The Italians had not the slightest intention of implementing the agreement. While the plan was being discussed, Dalmazzo himself was in the next room with senior German officers, negotiating a passage to Italy for himself and his family.

Another British liaison officer went to Dibra to contact General Puccini, commanding the Firenze Division. He ordered him to take his division to Burrell, fully armed and equipped, in order to prevent weapons or material falling into German hands. All Italian troops accordingly left Dibra, escorted by a British NCO and a band of partisans. Such arms as they left behind were handed over to the partisans.

A third British officer went to Valona to interview the Italian GOC [General Officer Commanding], IV Corps, who declared that he would resist any attempt to disarm his men, but that he would not oppose a peaceful occupation of the town. On 10 September a considerable German force reached the town. Italian morale was low; practically no resistance was offered and the GOC was taken prisoner.

At Korca the Italians refused to hand over their arms either to the partisans or to the Germans. Their one wish was to return to Itály without fighting anyone, but they realized that the Germans controlled the coastal area.

Nevertheless, many Italians came over to the partisans and were organized into fighting units. Another plan was made for an attack on Tirana from both sides.

The Italian Brennero Division, which was concentrated at Kavaje, was to take up positions astride the roads linking Tirana and Durazzo. This division had been disarmed at first but had received back their arms on agreeing to help the Germans. Colonel Caligari, Chief of Staff, assured the British officer who interviewed him that this was only a ruse to get back their arms, but they meant to fight the Germans as soon as the division was in the required positions.

The Brennero Division, after a long delay in which they played off the Germans against the British and Albanians, fled to Durazzo, where they attempted to embark for Italy. This put an end to any immediate hope of capturing Tirana.

The collapse of Italy, followed by the German occupation, inevitably brought out the difference between the two main parties. The Central Council of Resistance of the LNC declared war to the death against all Germans and accepted the co-belligerency of all Italians who were prepared to fight their former allies. The Nationalist organization, Balli Kombetar, so far from fighting the Germans, actually began to help them.

In early October, fierce fighting broke out between Germans and partisans in many districts. Supplied through the British missions, the partisans inflicted a steady toll on German troops throughout the month.

On 15 October, Brigadier E. F. Davies landed with a complete staff and orders from General Sir Henry Maitland-Wilson "to kill Germans." He talked with the LNC and Nationalist leaders and tried to increase cooperation between all parties.

The Germans now fully realized that the Albanian partisan movement presented a

grave threat to their security, and throughout November a series of antipartisan drives took place. There was fierce fighting in many places, and particularly at Dibra.

Despite their repressive campaign, the Germans were still compelled by partisan activities to keep a force of nearly three divisions in Albania. Despite the vigilance of the Germans, their constant patrols and their policy of coordinated savagery, the partisans continued to destroy enemy vehicles, blow bridges, harass highways, and kill Germans.

In 1944 the German drives against the partisans continued unabated against undaunted resistance. Two more brigades were formed in January and there were then over 5,000 men engaged in active operations against the Germans.

By the end of February the position of the partisans had improved considerably. This was partly due to the withdrawal of the crack Jaeger Division and its replacement by inferior troops, partly to improved weather conditions, but mainly to the effect of British aid in the form of stores infiltrated into the country by sea and air, and the training and organization which had been given to the Albanian partisan troops by British liaison officers.

In mid-April the Royal Air Force sent Spitfires sweeping over main roads. In two days over one hundred enemy vehicles were accounted for and the enemy was forced to suspend operations against the partisans and retire to his base.

By the end of April there were seven partisan brigades and ten battalion groups, comprising 12,000 men. As a result of training by British liaison officers, this force was now not only capable of offering organized resistance to German drives but of undertaking coordinated offensives against the enemy garrisons and communications. The total strength of the partisan forces quickly grew to over 20,000.

At the beginning of June the Germans brought in one mountain division and began another full-scale drive. They attacked from every direction, combining their efforts with a dive-bombing and machine-gunning program on British missions and partisan headquarters. The campaign appeared to be succeeding, but it eventually broke against the stubborn resistance of the Albanian partisans.

In July, partisan operations received further encouragement by a successful commando raid at Spile. Commandos landed in daylight on the 29th with supporting arms, and in cooperation with the Royal Air Force and the Royal Navy. Partisans were in positions ready to cut off German reinforcements. A British liaison officer blew up a section of the road running along the beach to prevent mobile reinforcement. The garrison was wiped out. Thirty Germans were killed and thirty taken prisoner. The rest were dispersed. At 1600 hours the commandos withdrew and the British liaison officer led the partisans down to mop up the scattered Germans.

In July the effect of the formation of the Balkan Air Force was seen in closer air-ground cooperation in Albania.

On 10 and 11 August rocket-firing Beaufighters attacked the barracks at Dibra and scored many direct hits, completely gutting the buildings, killing many Germans, and dispersing an impending attack. The partisans seized the initiative, drove the enemy back to their ruined barracks, killed many more, and captured a large quantity of booty. The Balkan Air Force hammered the place twice more and the enemy were forced to withdraw.

About this time the Germans were beginning to evacuate their forces from Greece. The British mission began to blow the main roads from the border to prevent this maneuver.

The Albanian National Liberation Army grew quickly. By September 1944 the force numbered 30,000 men. On 3 September, after more than six weeks of hard fighting, the key town of Dibra was finally liberated by the Partisan 1st Division. Other successes followed in quick succession, including the taking of Kruja where 120 Germans were killed or captured.

The Germans withdrew their mountain division. Partisans maintained their northward pressure.

On 27 September, commandos made another

large-scale raid with all supporting arms—this time at Sarande. They received most valuable support from 400 partisans under the command of Islam Radovica. After bitter fighting, Sarande was occupied and the Germans lost many killed and wounded.

By 26 November, Albania was on the eve of complete liberation. Durazzo fell, and the situation of the two German divisions remaining in the Scutari-Podgorica area of northern Albania became well-nigh hopeless.

This happy state of affairs could hardly have been reached without the work of the British missions. The perilous task of supply, the lonely vigil on dropping-ground and beach to ensure the Albanian partisans food and arms, sabotage of vital enemy communications—these were the early battles for Albania. British officers and men, living in primitive conditions, often in snow and bitter cold, constantly raided by the enemy, moving from place to place, hunting and hunted, helped to train the Albanian partisans, supplied them with the necessities of life and of war, and fought alongside them in the battles of eighteen long months.

In the bitter winter of 1943 the missions were isolated for weeks. No planes could reach them to drop supplies. They had no British rations. They existed on maize bread and bean soup. Officers and men lived together, cooped up in one room. A sense of humor was essential under such conditions, and it was there.

Near the coast were the men who received the supplies from the sea. At first, small British and Italian boats were used. They crept into little fishing ports and little-known coves at night. As operations proceeded and the partisans consolidated more of the coastline, larger ships were used, bringing greater consignments of supplies of all kinds, including heavier weapons and mechanical transport.

Nearly two years of gruelling and dangerous work are drawing to a close. Fast bonds of friendship have been forged between Albanians and British in the bitter battles for liberation. Both wait for the hour of final freedom.

The Storming of Königsberg

Digested at the Command and General Staff School from an article in *Information Bulletin*, Washington Embassy of the U.S.S.R., 12 April 1945.

KÖNIGSBERG, greatest German fortress and bulwark of Prussianism and German militarism, has been crushed by the Red Army.

For half a century the Germans built and improved the Königsberg fortress. On the eve of the assault by Marshall Vasilievsky's and General Bagramyan's troops, all the eighty square miles of the city were one solid fortress. One hundred thousand civilian Germans had been left in the city to build defenses.

Königsberg was shielded by a line of sixteen forts. All buildings in the city were connected by newly-built underground passages. The streets were barred with brick and steel barricades, several yards thick. Ancient castles, palaces, and even cemeteries were converted into forts.

While rivers and canals were still icebound, Russian troops advancing on Königsberg captured a whole network of locks by means of which the German command had planned to inundate the approaches to the city. When the spring floods came, the rivers and canals girdling Königsberg were already in Russian hands.

Preparations for the storming of Königsberg were begun many days ago. Extensive ground and air reconnaissance yielded detailed data on the enemy's armament and fortifications despite the fact that for the purpose of concealing their defense systems the Germans deliberately weakened their fire during the weeks preceding the Russian onslaught.

Day and night, Marshal Vasilievsky's troops underwent combat training. Forts, pillboxes, and barricades—exact replicas of the Königsberg fortifications—were built be-

hind the front line. Men learned how to storm a fortress, wage street fighting, quickly climb into house windows, fight the enemy at close quarters inside casemates and houses, and blackade and storm pillboxes.

Behind the ten-foot walls of the three-story underground forts, strong garrisons had ensconced themselves with ample stocks of ammunition, provisions, and medical supplies. Every inch of ground in front of each fort was covered by the Germans.

The thunder of an unparalleled artillery concentration announced the beginning of the Soviet assault. Each gun pounded at a previously assigned target. The first guns began to divest the underground forts of their upper cover; they were followed by heavy siege guns which blasted steel and concrete into the air. Russian Stormovik and bomber forces dumped bombs and shells on scores of enemy divisions defending Königsberg.

The Baltic Red Banner Fleet Air Arm struck simultaneously at the remnants of the East Prussian German Army and German Navy in the port of Pillau and in Danzig Bay. On 7 and 8 April, Russian fliers sank fourteen enemy ships, including nine transports totaling 36,000 tons, one destroyer, and two escort ships. Five ships—including one cruiser, one destroyer, and two transports totaling 10,000 tons—were damaged by direct bomb hits.

The assault on the city began in the morning. The Germans fought back savagely. Under enemy fire, Soviet soldiers brought up assault bridges, stepladders, and explosives. Sappers blew up the steep granite-covered banks of the canals, blazing a trail for the infantry. Picked German divisions defending the city were backed by a huge concentration of artillery.

Forty-two thousand German officers and men headed by the commandant of the fortress, General Lasch, with his staff, surrendered in the two days of storming the East Prussian capital. The German command resorted to the most brutal measures to compel the Königsberg garrison to hold out. Scores of deserters were shot daily at the northern railway station, and as a warning to others their bodies, suspended by the feet, were left in the central square for several days. Each day the *Königsberg Zeitung* printed lists of men shot for desertion.

The garrisons of some forts fought until they were blown up with the fortress. Other forts surrendered only after having lost over half their personnel, exterminated in hand-to-hand fighting inside the casemates.

Rocket Terror of the Fiords

Digested at the Command and General Staff School from an article by Squadron Leader William Simpson, DFC, in *Britain* (British Information Services) April 1945.

THIS battle has been going on for many months. Its immediate object is to destroy all enemy shipping in Norwegian waters. Part of this shipping is used to carry oil from Germany to the U-boats operating from Norway, and there to take in dumped petrol and carry it back to Germany. The rest attempts to carry food, ammunition, and equipment to the German troops manning the defenses, and to evacuate troops and equipment.

Norway is far from the great battlefronts of Europe. So are the German divisions that occupy her. And the cutting off of their only means of returning to Germany is a major operation.

Organized sabotage and heavy snowfalls have reduced to a trickle the flow of traffic along the few Norwegian roads and railways. Everything must now go by sea. Movement by day is fatal for German ships. It invites deadly attacks by Beaufighters and Mosquitoes.

So the Germans sail by night, risking the torpedoes of night-flying Beaufighters, while hugging the coast, and the bombs of Hali-

faxes if they are lucky enough to reach the wider waters of the Skagerrak. And by day they try to hide, anchored close to the steep cliffs of one of the countless fiords.

But even in the fiords they are no longer safe. For there they are spotted, and then destroyed by rocket-carrying Beaufighters and Mosquitoes. Most deadly menace of all are the rocket-carrying Mosquitoes. This is how they operate:

A number of squadrons are organized into a striking force—called a "strike." As soon as it is known that enemy ships are hiding in a harbor or fiord, the strike is briefed and takes off. Sometimes escorted by Mustangs, it may also be accompanied by Beaufighters. And it may be directed to the right spot by Norwegian pilots and observers.

These Norwegians have earned the unqualified respect and admiration of the RAF air crews. They are the key men in the success of attacks. It is they who bring back most of the information about the existence and position of enemy shipping.

Every week they fly out in Mosquitoes. They go on lone patrols, searching wide areas of the thousands of fiords that carry the sea deep into the mountains of Norway. Sometimes they may catch a fleeting glimpse of home. But they cannot linger, for there are crack squadrons of German fighters—FW 190's and Me 109's—waiting to pounce on them.

Not that the fighters get their own way, for the Norwegians are deadly opponents when sitting behind the sights of the four cannon mounted in the nose of each Mosquito.

Their task is as difficult as it is dangerous. Many fiords and mountains look alike. One false move will quickly lead to destruction—by flak, fighters, or mountain slope. It is quite easy to become trapped in the narrow, mountain-bordered waters of a fiord when flying low in a fast aircraft. So they spend hours each day studying maps and photographs, enriching an already considerable knowledge.

They have another task of equal importance. For, flying out with the strike, they must guide it into the target area, along a flak-free route, making full use of the mountains as cover to achieve surprise.

The planes fly out to Norway on a certain course. The approach to the target is carefully planned. Full use is made of available cover. Skirting the mountains and out of sight of the German naval gunners, they suddenly appear at the crest of a cliff overlooking the fiord in which enemy ships may be at anchor. Then, after diving down the slope of the cliff, they settle into a certain fixed speed and angle of attack, and pour cannon shells and rockets into the sides of the destroyers.

The first wave may concentrate on silencing the guns, into the very muzzles of which it is flying. This is done in the usual way—by cannon fire. And as the cannon shells hit the bridge and superstructure, rockets are released with a mighty roar.

Following waves use the same tactics, but put greater emphasis on the registering of hits with rockets.

Rockets and cannon are so synchronized that the same gun sight can be used for both. When cannon hits are seen, the rockets are immediately released with the certainty of getting some hits. The racks are arranged in such a way that a stick of rockets is laid across the target. This ensures hits by more than half of the eight. Those that undershoot will continue under water to hole the hull, and those that are dead on will hit dry on one side and probably come out below the water-line on the other. Traveling through water and air alike at a speed of several hundred miles an hour, they go right through cargo and engines—setting the ship alight and coming out again on the other side.

No waters are safe, for the Mosquitoes will fly into the narrowest fiord and attack with deadly effect before pulling up rapidly to clear the cliffs and escape. Nearly always the ship catches fire and, blazing from end to end, sinks.

German fighters present the greatest danger to a strike. They may be lurking near by, waiting for a chance to pick off wounded stragglers unable to keep formation. The

German fighter squadrons now in Norway are highly efficient.

Because it is too dangerous to hang around the target area, the results of rocket hits are difficult to assess. For the rockets used are normally nonexplosive, having armor-piercing heads. They go through a vessel like a giant dart. And it may be another hour or more before that vessel starts to sink.

A great variety of shipping is seen in the Norwegian fiords. There are the many small vessels of less than 500 tons that handle fiord traffic. These are left strictly alone. Then there are many tramps varying in size from 1,000 to 4,000 tons, and fitted with two or three guns; motor vessels of 5,000 to 6,000 tons, often mounting as many as six flak platforms; and some tankers of between 6,000 and 8,000 tons. For convoy escort there are armed trawlers, M-class minesweepers of 600 tons, and occasionally destroyers.

The rocket plane has bottled up most of this traffic with disastrous results to the Germans on the Western and Eastern Fronts.

South Africa's Part in World War II

Digested at the Command and General Staff School from an article in *The Times* (London) 16 January 1945.

In spite of the high prestige enjoyed by Field Marshal Smuts in Great Britain, comparatively little is known here of South Africa's contribution to the war. If the report is true that Hitler laughed when he heard that this young nation, small in population and possessing few great industries, had come into the war, he could not possibly have known that she was to build up a great volunteer army of one out of every three of the adult population; to create a powerful air force that was destined to drop both the first and the last bombs in the African campaigns, and naval forces that were to operate in foreign waters.

All members of the Union Defense Force are volunteers. Soon after the declaration of war, tens of thousands of men and women streamed into it and were asked to sign the "Africa Oath," so that they could be used anywhere on the continent. They were then entitled to wear the red shoulder tab, a distinguishing feature of the South African uniform. Since then, nearly nine out of every ten recruits (and this in spite of several years of war) have signed another voluntary oath, this time to serve anywhere.

In 1939 the Union had only a small permanent force, and hardly any equipment. There were, in fact, only two obsolete tanks, a handful of antiquated airplanes, and only enough of one single ordnance item—braces!—with which to go to war. Yet within thirty minutes of Mussolini's declaration of 10 June 1940, South African Air Force airplanes were on their way to bomb military installations in Abyssinia, and the 1st Brigade, trained and equipped, was ready to sail for service in East Africa. By January 1941, the 1st Division was assembled in East Africa, and during the next few months it played a prominent part in tearing that part of the Italian Empire to shreds and tatters. By July of that year the 1st Division was in Egypt, together with the 2d Division recently arrived from the south, to fight in the defense of the vital Middle East. In those swaying battles—from Cunningham's offensive in November 1941, to the decisive breakthrough at Alamein—Springbok soldiers fought side by side with their allies. Casualties had been heavy. The 5th Brigade had been virtually destroyed at Sidi Rezegh. Another two brigades had been lost at Tobruk. After thirty months of continuous campaigning, the 1st Division was withdrawn after the Alamein battle to return to the Union for conversion into armor, but when von Arnim finally surrendered in Tunisia, thirty Springbok units were still with the victorious armies. Meanwhile, the 7th Brigade had landed in Madagascar. In the Union itself additional forces stood ready to ward off any threatened Japanese attack. Enemy submarines, operating in large num-

bers in South African waters, had been attacked and sunk, and the line of communications kept open.

For the first time in South African military history, an armored division had been constituted by February 1943. It was this division which led the Eighth Army in its vigorous dash from Rome to Florence, some 220 miles, in under sixty days. That advance was made in difficult country, in face of extensive demolitions, along secondary roads, and with a bitter enemy staging a masterly withdrawal. The 6th Armored Division remained an integral part of the Allied forces in Italy. Field Marshal Alexander has called them "magnificent fighters."

The Air Force has developed out of recognition. In General Smut's words, it is "perhaps our outstanding contribution." It has been in battle continuously from early 1940, when it swept the Italians out of the skies in Abyssinia and paved the way for the disintegration of Mussolini's armies. South African light bombers became recognized aces in "shuttle-bombing." In Italy, Springbok fighter-bombers cut enemy railway communications 129 times in a month, and were three times congratulated by the armies for doing so. One of the most hazardous missions of the war, that of flying supplies from southern Italy to the Polish patriots in Warsaw, was undertaken by South African Liberators, who, flying at only a few hundred feet and almost at stalling speed to ensure accuracy, dropped many tons of supplies, at heavy cost to themselves. Hundreds of South Africans fly with the Royal Air Force.

South African naval forces consist o scores of "little ships" which have not only helped to keep Union waters clear of enemy mines but have fought in the Mediterranean and elsewhere. Some of them helped in keeping alive the Tobruk garrison in 1941 and in opening the harbor of Tripoli to Montgomery's advancing army.

But the exploits of all these fighting men is only half the story. In the Union, history has been made by the executives and workers who have produced war goods sorely needed to keep the men in the field. The immediate task was to equip thousands of new volunteers. At first it seemed relatively easy South Africa would produce what she could and import the rest. But with the fall of France, Britain was left with the barest minimum of equipment for her own survival, and the great production plants of America had not yet swung into action South Africa was forced back on her own resources and initiative. The problem magnified itself when, in addition to supplying many of her own wants, she had to provide for the growing numbers of ships rounding the Cape and for the large armies gathering in the Middle East.

The Right Spirit

There are many factors which go to make an efficient army in war. . . . I only want to emphasize one, and that is the RIGHT SPIRIT. British troops have always been imbued with the right spirit, a spirit which never knows defeat. I was amused recently in London to find in a military hospital a dozen patients who had a special dinner to celebrate Dunkirk, the biggest defeat the British Army has ever suffered. But its spirit was not defeated, and so I think these men had every right to enjoy a good dinner.

Closely bound up with the right spirit is the right discipline—the discipline of good will, not the discipline of fear. Not a negative restraint but a positive loyalty. For discipline is not an evil burden to be endured but is a noble quality to be achieved.

—Lieutenant General Sir Arthur Smith, Commander in Chief, Paiforce (Persia and Iraq Command)